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BIRD WATCHERS OF POINT PELEE NATIONAL PARK, ONTARIO: THEIR CHARACTERISTICS AND ACTIVITIES, WITH SPECIAL CONSIDERATION TO THEIR SOCIAL AND RESOURCE IMPACTS

by

GREGORY DEAN FENTON

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE

OF MASTER OF SCIENCE

IN

WILDLAND RECREATION

DEPARTMENT OF FOREST SCIENCE

EDMONTON, ALBERTA

SPRING, 1988

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.....

Supervisor

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Date March 3 1988

Abstract

Point Pelee National Park, Ontario, is one of the most famous locations in the world for watching the spring passerine migration, drawing at the present time 80,000 gate visits of spring bird watchers to its unique and fragile resource base. In the spring of 1985 a University of Alberta research team examined the social and ecological factors associated with this recreation user group through the use of on-site personal interviews, participant observations, and trail measurements. This data, representing over 2000 bird watchers, documents a wide range of birder differential use characteristics and impact parameters.

Pelee birding is a highly intensified activity with birders spending an average of 9.8 hours each day, during an average visit of 4.6 days. This study found no significant relationship between high densities of park visitors and perceptions of crowding. Factors which were shown to contribute to perceptions of crowding included environmental disturbances by other birders and conflicts with other visitors: both birders and other user groups. Factors which contributed to visitor satisfaction included friendliness of other birders and related sharing of birding information and sightings.

Although bird watchers visiting Point Pelee are highly educated, with 59.7% of those interviewed holding the minimum of a bachelor's degree and 16.9 holding doctorate degrees, they also had a high negative impact on the ecological resources of the park resulting from off trail excursions in pursuit of birds. Forty-three percent of vegetation damage was a result of marginal trail viewing, 27% caused by exploratory impact, and 18% was caused by pursuit behavior. Resulting unofficial paths accounted for 62% of total trail length in the study area.

Potential management implications, as they relate to Point Pelee National Park, are presented and discussed.

KEY WORDS: bird watching, nonconsumptive wildlife use, social impact, ecological impact, national park

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I would like to take this opportunity to acknowledge a number of people and organizations for their assistance throughout the field study at Point Pelee and towards the completion of this thesis. First, I would like to thank the members of the research team who spent many long, and I hope enjoyable hours, talking to and interacting with bird watchers at Point Pelee National Park. These people include Robin Bovey, Carol DeVries, Ron Hammerstedt, Margo Hervieux, Mike Quinn, and Libby Weir. Second, the Superintendent, Mr. James Barlow and staff at Point Pelee National Park. Third, the various funding sources who made travel to the park and subsequent computer data analysis possible. These include the Canadian Forestry Service through their Block Grant Funding Program and the Canadian Wildlife Service through their University Research Support Fund. Finally, I would like to thank the members of my graduate research committee, Dr. Edgar Jackson and Mr. Burn Evans, who provided me much needed critical review and comment which enabled me to complete this thesis. A special thank-you to Dr. James Butler, my academic supervisor, for his continued support and encouragement throughout this research study and my post-graduate work at the University of Alberta.

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I. Introduction

A. Park Management Concerns

National parks throughout the world have been beset by a variety of management problems. These range from ecological problems such as threats to the preservation of sensitive wildlife and fragile vegetation, to cultural/social problems of competing economic uses of parklands, to administrative/institutional problems of inadequate funding and manpower (Manning 1979). The most threatening of all problems, however, and at the same time the most paradoxical, are the adverse impacts associated with increasing use of national parks.

The primary purpose of national parks of Canada is to protect for all time representative natural areas of Canadian significance (Parks Canada 1984). At the same time, the national parks are dedicated to the people of Canada for their benefit, education, and enjoyment. This dual role of national parks poses a dilemma for park managers who must strike a compromise and achieve a balance between preservation and use in the context of the resources and the recreational demands put upon them. In order to do this, park managers must fully understand the physical and biological attributes of the park resource, the nature of the recreational uses, and the types and extent of the environmental damage the recreational activities might cause. The dilemma between preservation and use is particularly apparent at Point Pelee National Park, Ontario, a park which is one of the smallest and most sensitive in the Canadian Park System, yet one which has the largest potential day-use market.

Bird watching is probably the fastest growing wildlife-related recreation activity in North America (Butler 1984; Harrison 1976; Scofield 1978). Participation in Canada and the United States has increased from combined estimates of eight million in 1965 to participation currently of twenty million people each year (Kellert 1985; Filion et al. 1983; Lyons 1982; U.S. Bureau of Outdoor Recreation 1967). Conservative estimates of economic expenditures associated with bird watching in North America are in excess of two billion dollars annually

(Filion et al. 1983; USDI 1982).

Bird watching as a recreation activity at Point Pelee National Park has been growing steadily in popularity since the turn of the century when noted ornithologists P.A. Taverner, W. Brodie, and W.E. Saunders drew the attention of the Great Lakes Ornithological Club to the Point Pelee spring migration. Since the park is located on both the Atlantic and Mississippi Flyways, and the apex of the southern Ontario Peninsula, birds are funnelled through Pelee. This migration phenomenon occurs in both the spring and the fall. It is the spring migration, however, with its greater concentrations and colorful wood warblers that draw the largest crowds of people. As of 1985, 332 different species of bird have been recorded: a paradise for the bird enthusiast.

Point Pelee National Park has become one of the most famous locations in the world for watching the migration of birds during the spring months of April and May (Harrison 1976). Presently some 60,000 to 80,000 gate visits of bird watchers are recorded during the spring passerine migration each year involving more than 20,000 individual visitors. On a busy day during the peak of the migration 6,000 people can be found within the confines of the park's 6.2 square kilometers landbase. Of these, 70% (4,200 individuals) can be found at any one time in the Tip Area (an area of only 1.5 square kilometers at the end of the peninsula).

Bird watching has traditionally been seen as a nonconsumptive wildlife-related recreation activity in which there is little or no impact on the natural resource base. In the past ten years however, in specified locations, the activity has begun to place stress on both the birds and associated habitats (Graham 1980; Webster 1980; Wilkes 1977).

In addition to concerns about ecological impacts, the question of social impacts has arisen, especially with planners and managers placing increasing emphasis on experiential objectives in an attempt to ensure the provision of a quality recreation experience. Accordingly, there is a need to understand the satisfaction and motivational variables associated with birding and how they are affected by the increasing numbers of people participating in the activity. The ability to address some of these issues depends upon the success of achieving a better and more thorough understanding of the specific user group.

This is also important from a wildlife conservation standpoint as bird watchers are seen as being representative of the new principal wave of wildlife guardians and a sophisticated political force. Birders have, and will continue, for the foreseeable future, to be the leaders in the North American conservation movement, a role formerly held by sport hunters through the early half of the century (Butler 1984).

B. Study Area Location and Description

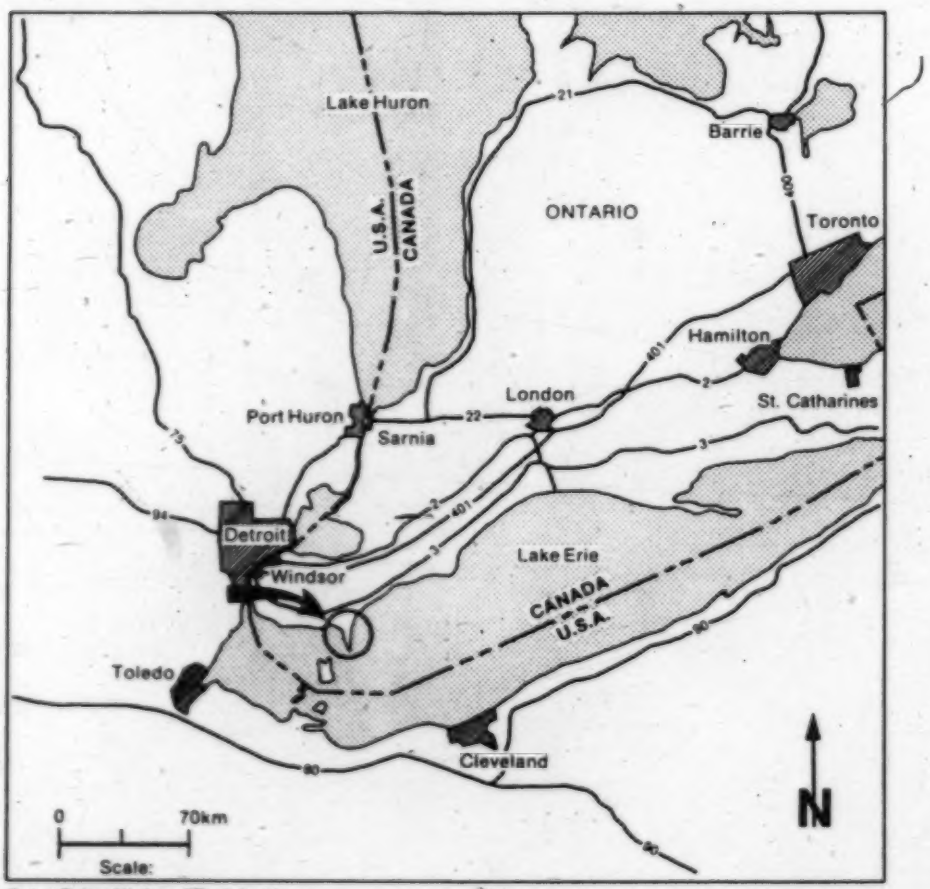
Point Pelee National Park is a day-use park located in the southern part of Essex County of southern Ontario, 80 kilometers southwest of the large urban area of Windsor-Detroit (Figure I-1). It is a 15 kilometer sandspit formation extending into the western basin of Lake Erie. Of the park's 1564 hectare area (15.64 square kilometers), 29 percent (451 hectares) are drylands and 71 percent (1113 hectares) are fresh water marsh.

Point Pelee is a unique combination of landform and life. It is an unusual sandspit formation, which due to its United States-Canada boundary positioning, is the most southern land in mainland Canada. The shallow Lake Erie almost surrounds the park, and the climate, moderated by the lake, suits many southern forms of plants and animals.

The park falls within the northern limits of a Canadian threatened ecosystem called Carolinian. This forest ecosystem, with its associated plant and animal communities once covered most of southern Ontario. Over the past 200 years, clearing of hardwoods for timber and draining of wetlands for farmlands has eliminated most of Canada's Carolinian Zone. Point Pelee encompasses sixteen square kilometers of this remnant forest ecosystem, an ecosystem which includes the northern most limits of plant and animal species found nowhere else in Canada.

The original environment and landscape of Point Pelee National Park have been significantly altered by human activity. Prior to its designation as a national park, Pelee was used extensively for farming, forestry, fishing, and trapping. The park has also seen use throughout the years as a popular recreation area. At various times throughout the park, there have been campgrounds, hotels, and private cottages. Through an on-going program of

Point Pelee National Park in it's
Canadian Context



Point Pelee National Park in it's
Canadian Context

Figure I-1. The location of Point Pelee National Park

land acquisition, cottage activities have been almost phased out. The visible effects of human use have been reduced in recent years through natural resource management activities.

For the purposes of this study, Point Pelee National Park is divided into six management (study) areas (Figure I-2). This division is an adaptation of the activity areas described in the Point Pelee National Park Management Plan (Parks Canada 1982a) and is as follows:

1. Tip Area;
2. Sparrow Field;
3. Woodland Nature Trail (Interpretive Center);
4. Tilden Woods;
5. DeLaurier Trail; and
6. Marsh Boardwalk.

A general description of each of the study areas is provided in the following.

The **Tip Study Area** extends from south of the Sparrow Field at the northern edge of the transit loop to the Tip of the park, and from the western to the eastern shoreline (Figure I-2). Facilities in this study area include a food concession, picnic area, toilet/change house, and boardwalk trail. Vehicle access is restricted during the regular birding season (April 20 to May 20) with a public transit system being available between the Visitor Center and the Tip Concession at 15 to 20 minute intervals beginning at 6:00 a.m. daily.

The Tip Area is comprised of two Resource Management Units as described by the Point Pelee National Park Management Plan (Parks Canada 1982a); the **Sand Plain Unit** and the **Shoreline Unit**. This study area is particularly important as a resting and feeding area for migrating birds. Vegetation varies from shrubs to forest comprising species such as hackberry, red cedar, chokecherry, black cherry, and wafer ash. The vegetation community at the Tip is one of the most fragile areas in the park, yet one of the most utilized during the birding season with large numbers of people gathering in this small area to watch the spring migrants.

The maze of trails in the Tip Study Area is testimony to some of the off trail impact problems. The official trails provide a circular route around the Tip. A 0.8 kilometer

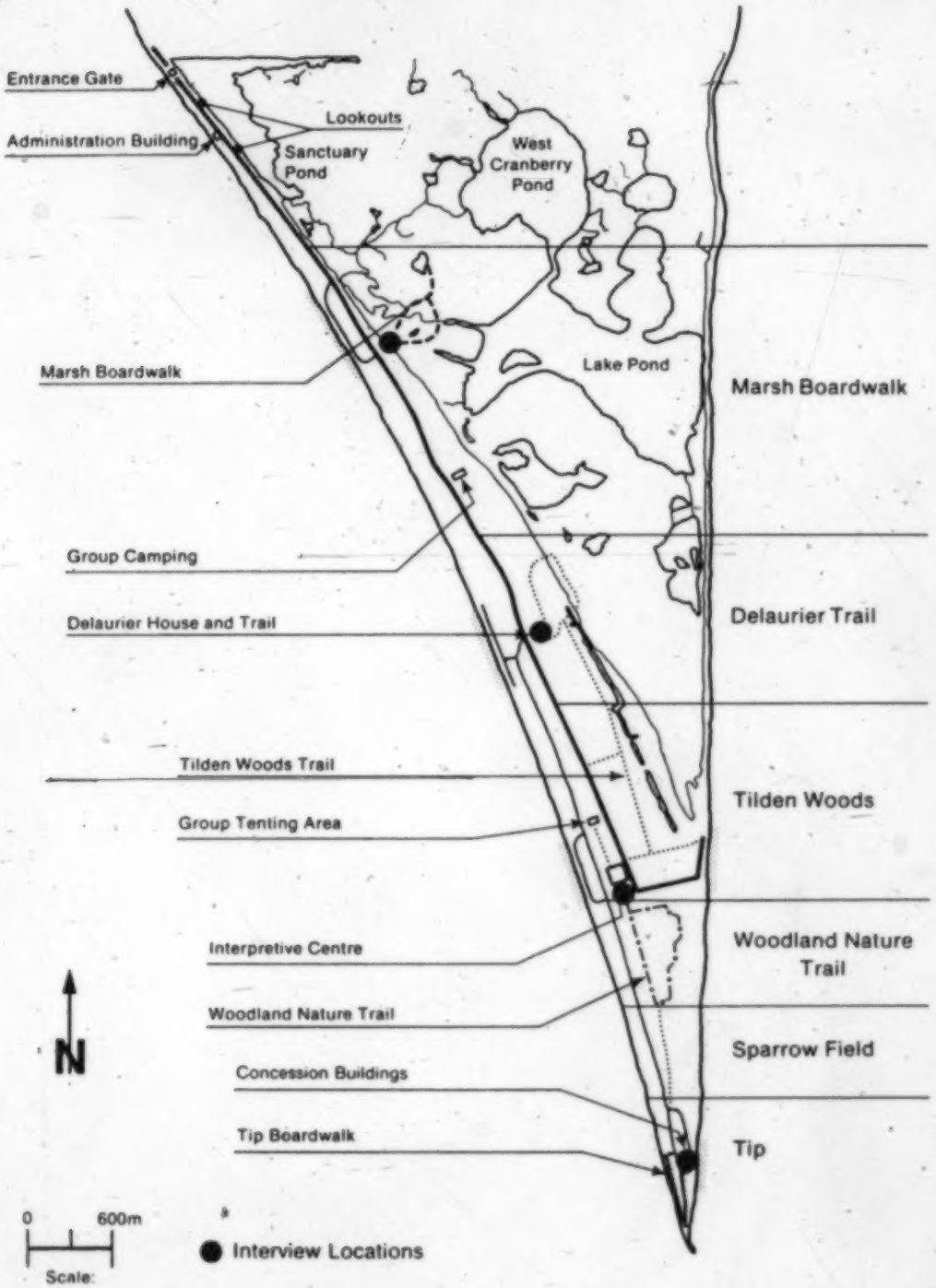


Figure I-2. Study areas and existing land uses at Point Pelee National Park — Spring, 1985

boardwalk trail extends from the end of the transit loop to the Tip, then continues north along the west beach on what used to be the old loop road. Several unofficial trails of varying lengths and widths extend into what is known as the Loop Woods.

Some of the associated problems in this area include: 1) trampling of beach and sand vegetation and exposing sand surfaces; 2) trampling and compacting the thin organic soil layers in the Loop Woods; and 3) unofficial trail formation throughout.

2. The **Sparrow Field Study Area** lies in the south-central portion of the park, falls primarily within the Sand Plain Resource Management Unit (Parks Canada 1982a), and comprises a large, open, grassy field just northeast of the transit loop. The study area extends north to the Woodland Nature Trail Study Area along an unofficial trail (Figure I-2). This open field is the remnant of cultivated fields which have begun to regenerate. There are no existing facilities within this study area.

The field edges are forested and the field itself has scattered individuals of red cedar and hackberry. A number of native prairie plant species are found within this study area including the prickly pear cactus, a species classified as rare in Ontario. The open grassy field, with its forested edges provides optimal foraging and nesting habitat for both migrant and native bird species. The open field also allows for easy accessibility and visibility to bird watchers so is quite popular, particularly as it provides the opportunity of seeing open-field bird species such as bobolinks, grasshopper sparrows, and vesper sparrows.

Many birders return to the Visitor Center and Woodland Trail from the Tip Area along a narrow, unofficial trail that begins at the north end of the Sparrow Field. Many smaller spur trails leave this trail at irregular intervals. Compared to other vegetation communities in the park, this grassy field community is more able to withstand trampling by bird watchers.

3. The **Woodland Nature Trail Study Area** is located in the south-central and south-eastern portions of the park just south of the Visitor Center (Figure I-2). It encompasses two resource management units; the Sand Plains Unit and the Ridge and Trough Unit (Parks Canada 1982a). The Sand Plains Unit, located immediately behind the Visitor

Center and extending 1.5 kilometers south, is a mature dry-mesic forest. It includes a combination of rare Ontario plant species such as prickly pear cactus, redbud, prairie rose, puccoon, and tree species such as red cedar, black walnut, chestnut oak, chinquapin oak, basswood, and hackberry. To the southeast of the Visitor Center is the Trough and Ridge Unit, characterized by lowland swamp. It is a transition zone between the marsh and terrestrial environments of the park and consists of a series of low ridges alternating with shallow flat troughs running parallel to the western shoreline. Vegetation is varied with black walnut, silver maple, green ash, sycamore, and shagbark hickory on the ridges, and silver maple, green ash, hackberry, black ash, and cottonwood occupying the sloughs.

The diversity of habitat (old fields, shrub, dry forest, wet forest) in the Woodland Nature Trail Study Area provides good habitat for a variety of birds, mammals, reptiles, and amphibians. Species of particular interest include the Louisiana waterthrush, prothonatory warbler, five-lined skink, and spotted turtle. There are two loops to the Woodland Nature Trail. The first is a 0.4 kilometer loop that passes through a dense stand of oak, walnut, hackberry, and maple. The second is a 2.8 kilometer loop which passes through old fields, dry mesic forest, and wet forest.

The Woodland Nature Trail Study Area is a very popular area for bird watchers throughout the day because of the variety and number of bird species found there. However, the Ridge and Trough Unit within this study unit presents severe limitations to trail use by birders because of poor drainage, organic soils, and the hazard of flooding. Problems associated with the management of this area include: 1) the large number of unofficial trails in the dry-mesic forest between the road and the Nature Trail; 2) top organic soil is easily compacted by trampling; 3) sensitive spring flowers (i.e., mayapple, solomon seal, and puccoon) are often trampled; and 4) trail widening in wet forest areas during spring flooding.

4. The **Tilden Woods Study Area** falls within the Sand Plains and Ridge and Trough Resource Management Units (Parks Canada 1982a) and is located in the central-northern swamp fringe just north and east of the park Visitor Center (Figure I-2).

The section of Tilden Woods along the east road is characteristically drier than the rest of the area due to better drainage. Plant species include hackberry, red oak, chestnut oak, black walnut, hop hornbeam, and black cherry. The rest of the study area is moist-wet mesic forest with plant species similar to those mentioned for the Woodland Nature Trail Study Area, with the addition of sassafras and bitternut hickory. A variety of migrant and resident bird species frequent this area of diverse habitat and so draw many bird watchers. Species of bird include cape may warbler, bay-breasted warbler, chestnut-sided warbler, and blue-gray knatcatchers.

The main trail in this area begins just north and east to the Visitor Center leading east and then north through the forest community and into the DeLaurier Trail Study Area. A junction trail runs west to the main road about 1.0 kilometers along the Tilden Trail. Some associated problems in this study area include: 1) unofficial spur trails from the main Tilden Trail (both east and west); and 2) trail widening during periods of spring flooding.

5. The **DeLaurier Trail Study Area** falls within the Sand Plains and Ridge and Trough Resource Management Units (Parks Canada 1982a). It is located in the north-central portion of the park, east of the main access road into the park (Figure I-2). Park facilities in this area include a picnic area, DeLaurier House, a parking lot (220 cars), and a boardwalk nature trail and viewing tower.

The study area contains a diverse vegetation type and is identified as being the highest value dryland habitat in the park for birds, mammals, and reptiles (Parks Canada 1982a). Much of the area is abandoned fields which have started to regenerate, with drainage canals in the wet mesic forest communities farther east. Plant species found in this area are similar to those described in the Woodland Nature Trail Study Area for both the dry-mesic and wet-mesic forest communities. These areas attract species of bird common to both forest communities and include eastern meadowlark, american woodcock, chestnut-sided towhee, yellow-breasted chat, tree swallow, and prothonatory warbler. This area is a popular one for bird watchers, being used quite heavily.

There are no severe management problems associated with this study area due to the fact that while some unofficial trail formation does exist in the open field area, the nature of the vegetation community is such that it can withstand some degree of trampling. The wet-mesic forest area trail system is mostly in the form of a boardwalk.

6. The **Marsh Boardwalk Study Area** is located within the Marsh Resource Management Unit (Parks Canada 1982a) in the north-central portion of the park, east of the main access road and north of the DeLaurier Trail Study Area (Figure I-2). Park facilities in this area include a 1.6 kilometer circular Boardwalk, a 15 meter observation tower, a food concession, and a picnic area.

The study area includes open water marsh dispersed with cattail mats which are accessible only by the boardwalk provided. The dominant vegetation cover is a herbaceous one of floating aquatic beds of cattails. The marsh is the preferred habitat of a variety of bird species which use the area for roosting, nesting, and resting. Species include common yellowthroat, red-winged blackbird, swamp sparrow, sora, great blue heron, and terns (both black and common).

The Marsh Boardwalk Study Area is a popular location for birders in the pre-dawn light who add marsh birds to their lists through voice identification. There are no major management problems associated with this particular area as bird watchers stay on the boardwalk during viewing.

C. Review of the Literature

The following section examines the literature as it pertains to bird watching activities, including its history as a recreation activity in North America and at Point Pelee National Park. A detailed examination of the literature as it pertains to social and ecological impacts created by recreation activities is carried out in Part II and Part III.

Bird Watching

The popularity of bird watching is not confined to North America. In terms of the percentage of citizens who watch, England ranks first. North America ranks second followed by Australia, Scandinavia, Holland, Belgium, and West Germany (Scofield 1978). Despite the popularity and visibility of this activity, the participants themselves are generally poorly understood, and subject to substantial misconceptions. In order to comprehend why this is so, one must obtain a better understanding of what bird watching is and then examine the long history associated with the activity.

Bird Watching as a Recreation Activity

Bird watching as a recreation activity involves different things to different people. For some, birding is simply watching the pigeons from a park bench or chickadees at a backyard feeder. Others see it as an activity where one goes out into the field with binoculars and field guide in hand to search for and identify regional bird life. Many other people see birding as a competitive sport. These hardcore birders are almost fanatical in their pursuit of new and rare bird species to add to their lists, travelling great distances and committing large amounts of time and money in their pursuit. Others see it as an ornithological study. These people study the appearance, behavior, and habitat of wild bird species in their natural environment. Regardless of the purpose that people have for watching birds, each obtains some sense of satisfaction and enjoyment from seeing and hearing them in their natural surroundings.

History

The history of bird watching in North America can be broken into four recognizable time periods which have been adopted from Kastner (1986). The first period began in the late 1600s and saw the drawing of attention of North American bird species to Europe and the rest of the World. This took place through the recording and pictorial depictions of bird species found in North America by wildlife artists such as Mark Catesby (1674-1749), Alexander Wilson (1766-1813), William Bartram (1756-1817), John

James Audubon (1785-1851), Thomas Nuttall (1786-1859), and John Townsend (1785-1851).

The second period was begun by Spencer Fullerton Baird (approximately 1858), who became the first curator of the Natural History Museum at the Smithsonian Institute. Baird spearheaded the collection and documentation of bird species throughout North America, collaborating with Thomas Brewer and Rodger Ridgway on the development of a three volume book North American Land Birds (Baird et al. 1884), conceived a distinctive American approach to ornithology, and as a by product, the discipline of birding. During this period the arts of bird watching were formally organized through the activities of William Brewster and Henry Henshaw (Kastner 1986). The activities of these two men, and other "... kindred spirits in Boston," (Kastner 1986 p. 30) led to the establishment of the first organization devoted to studying and watching birds: the Nuttall Ornithological Club. This period also saw the development of a Key to the Birds of North America by Elliot Coues (1872). This key was one of the handful of books that led birding into new grounds. Previous birding books, like those of Wilson's and Audubon's, were loosely organized sequences of descriptions. This book of Coues' allowed for the first time, "... anyone without the slightest knowledge of ornithology to identify any specimen in a few seconds" (Cutright and Brodhead 1981 p. 154).

The third period included the time in which the Audubon Society popularized bird watching and spread the word of bird protection. This period saw the enjoyment of birds for what they were: alive and in the field. People such as Frank Chapman and Theodore Roosevelt were concerned about the destruction of birds for food, fashion, and ornithological study. Chapman, founder of "Bird-Lore" a magazine devoted to the better understanding and appreciation of birds (and which later became the Audubon Society's official magazine), initiated the first Christmas Bird Count. Roosevelt, an avid birder himself, established fifty-three national bird reservations and increased the area of the national forests during his presidency. The Audubon Society, which appealed to average rather than expert birders, campaigned for and helped birds obtain further protection

through the Lacy Act of 1900, the first comprehensive federal law to provide protection for birds.

The fourth and final historical period included the era of the bird guide, initiated by Roger Tory Peterson. This period increased the numbers of watchers in North America up into the millions. Peterson's field guide, first published in 1934, found a wider and wider public and made it much easier to participate and enjoy the activity of bird watching. Other guides were published after this, all adopting the Peterson philosophy of emphasizing recognizable field marks, though not copying his techniques (Kastner 1986).

Point Pelee

Interest in the "....remarkable faunal and floral aspects of Point Pelee" (Taverner, no date p. 5), began in the late 1800s. After a visit by William Brodie in 1879, naturalists, ornithologists, botanists, and other scientists began to travel to the Pelee area in ever increasing numbers. Foremost among these early naturalists was W.E. Saunders, who reportedly first journeyed to the peninsula in 1882 (Battin 1975). In May, 1905 Saunders organized a field trip to Point Pelee with other prominent naturalists such as B.H. Swales, A.B. Klugh, P.A. Taverner, and J. Fleming. This trip, and many others, led to the establishment of the Great Lakes Ornithological Club. This club, which continued its active operation until 1927, was organized for the purposes of cooperation and intense study of the birds of the Great Lakes Region and the circulation of manuscript bulletins (Battin 1975). Several publications on the birds and vegetation were prepared, making Point Pelee's resources more widely known.

Bird watching has remained a major recreation activity at Point Pelee since 1918 when the Park was established by an Order-in-Council. It has only been the last twenty years however, that the numbers of visitors to the park has increased to the point where concern for the social and ecological impacts has arisen.

Socio-demographic Studies

The first important studies dealing with bird watching as a nonconsumptive wildlife-related recreation activity did so in very general terms. More (1979), in a literature review dealing with nonconsumptive wildlife users, stated that bird watching was first examined as a separate recreation activity by the U.S. Bureau of Outdoor Recreation in 1965. Since that time few studies have been carried out on nonconsumptive wildlife users (i.e., bird watchers) and those that have been carried out dealt with the numbers of participants with little or no information on socio-demographics (More 1979). Lyons (1982) recognized that, "though a sizable portion of the public participate in nonconsumptive activities, relatively little is known about the characteristics of this segment of the wildlife management clientele. Basic data pertaining to the characteristics and behaviors of nonconsumptive users ... are lacking" (Lyons 1982 p. 678). In a more recent participation study dealing solely with bird watchers, Kellert (1985) identified a number of important participant and environmental variables which, from a management standpoint, should be examined in detail. However, he only partially addressed some of these variables and concluded that, "a great deal more detailed and precise information will be needed ... more thorough research will be required before a sufficient understanding is achieved of the motivational and situational factors involved in bird watching" (Kellert 1985 p. 345).

A number of more specific bird watcher studies have been carried out by Environment Canada, Parks at Point Pelee National Park in an attempt to better understand birder activities and the impacts that they create. A majority of these studies fall into one of two categories: 1) those that deal with ecological impacts; and 2) those involved with visitor surveys. The ecological impact studies have primarily been impact studies examining Point Pelee's natural resource limitations (i.e., soils, vegetation, and wildlife) as they pertain to bird watching activities (Parks Canada 1977,1978,1982b). While these studies have led to an understanding of the physical and biological attributes of the park resources, their findings have led to short-term management solutions only.

Visitor survey studies, which examined socio-demographic and satisfaction variables of park visitors, have been carried out at Point Pelee National Park in the past (Grant 1975; Grant and Wall 1977). However, these examined summer visitors and did not look specifically at bird watchers, although birding was included as a recreation activity for the study period involved. More recently, efforts have been made to develop a Bird Watcher Management Strategy (Fulton 1980) and a Spring Migration Operational Plan (Mouland et al. 1985,1986). These plans dealt specifically with the spring bird watcher user group at Point Pelee National Park, identifying visitor experiences and resource protection concerns. They lacked however, the detailed visitor information that is required to make effective management decisions.

D. Research Objectives and Purpose

Purpose of the Study

The subject of this research was to review the question of the birder management problems at Point Pelee National Park in an integrated and interdisciplinary manner in order to identify and isolate the full range of social and ecological perspectives that are required to begin to understand the true complexity of the birder management issue. While this study was not intended to finalize or resolve completely all aspects involved in the birder management problems at Point Pelee, as an exploratory investigation it attempted to identify and clarify the necessary facets and consequences that will need to be reviewed in detail through future related investigations.

Research Objectives

1. To review the question of the birder management problems in an integrated and interdisciplinary manner in order to identify and isolate the full range of social and ecological perspectives that are required to begin to understand the true complexity of the issue.
2. To develop a methodology which would prove suitable for addressing the

interdisciplinary issues relevant to the birder management problems at Point Pelee National Park.

3. To focus upon the three central components of the investigation: the description of bird watcher characteristics and activities, identification of ecological impacts on the natural environment, and identification of social impacts created, using a wide range of research tools and methodologies toward the resolution of specific questions and hypotheses.
4. To provide baseline data which would aid in the development of an effective Birder Management Plan.
5. To identify research needs to further assist in planning and management concerning the impacts that bird watchers create, both in terms of their social and ecological impacts.

Statement of the Problem

The purpose of this research was to assess through participant observation and interview data the characteristics, activities, and social and ecological impacts of bird watchers in the Carolinian Forest Ecosystem of Point Pelee National Park. Particular reference is made to the birding activities during the annual spring bird migration of 1985.

Subproblems

The first subproblem. The first subproblem is to determine through an analysis of birder activities and responses, the characteristics of bird watchers that visit Point Pelee National Park during spring bird migrations.

The second subproblem. The second subproblem is to determine through an analysis of birder responses and observed activities, the social impacts that occur among bird watchers at Point Pelee National Park during spring bird migrations.

The third subproblem. The third subproblem is to determine through an analysis of birder responses and observed activities, the ecological impacts that are created by bird watchers at Point Pelee National Park during spring bird migrations.

The fourth subproblem. The fourth subproblem is to analyze the interrelationships and characteristics of the ecological and social impacts that occur at Point Pelee National Park during spring bird migrations.

Significance of the Study

The results will serve to improve the management of both bird watchers and the natural resource base of the park, providing important insight into the activities, characteristics, and ecological and social impacts of bird watchers.

Definition of Terms

The following provides definition of some of the more important and most often used terms found throughout this thesis.

1. **Bird Watcher** - a park visitor whose primary recreation activity while in the park is the observation and/or study of the appearances, activities, and habitat of bird species in their natural environment.
2. **Social Impact** - the social-psychological effect that increasing number of park visitors have on the quality of the recreation experience within the park setting, whether they be positive or negative.
3. **Ecological Impact** - the physical, and often negative effect, that park visitors (i.e., bird watchers) have on the natural resources of the park.
4. **Carolinian Forest Ecosystem** - a forest ecosystem typical of central-eastern North America. It includes an association of unique trees, wildflowers, mammals, birds, reptiles, amphibians, and insects found nowhere else in Canada.
5. **Spring Bird Migration** - the spring movement of bird species from one region to another in response to a change in the season; day length and temperature.

Organization of the Thesis

The study components of this thesis lend themselves, and are therefore presented, in a paper-format. Parts II and III are support chapters providing a detailed review of the literature relating to social and ecological impacts of recreation. Part IV (Paper I) deals with the characteristics and activities of bird watchers at Point Pelee National Park. This section provides a brief introduction of the specific concerns, briefly describes the park area, describes the methodology used in this portion of the study, presents the results, and discusses these results in a park management context. Part V (Paper II) deals specifically with the social impact component of the study. This section presents a brief introduction and description of the park area, describes the methodology used, presents the results, and analyzes and discusses the significance of those results. Part VI (Paper III) deals specifically with the ecological impact component of the study. As with the previous section, it provides a brief introduction to and description of the park area, describes the methodology used, presents the results, and analyses and discusses the most significant of these results. Part VII describes the implications as they pertain to the management of bird watchers at Point Pelee National Park during the annual spring bird migration. This section also identifies future research needs required in the attempt to better manage the birder and the birding resource at Point Pelee National Park.

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II. Review of Social Impact Research Literature

A. Introduction

National park managers, planners, researchers, and citizen groups are continually trying to find strategies which will help them to manage the growing numbers of North Americans participating in outdoor recreation activities in our National Parks so as to provide a quality recreation experience. Recreationists and tourists visiting our national parks, increased over 120 percent in Canadian national parks alone since 1969 (Carruthers 1979), have in many cases caused considerable environmental damage. Soils are compacted and eroded, fragile vegetation crushed, migration and reproductive cycles of wildlife disrupted, and water bodies silted and polluted. Visitors have had equally devastating impacts upon themselves by reducing the quality of the recreation experience through crowding, congestion, and conflicting recreational uses, particulary in those areas where recreation use has been traditionally high.

The social carrying capacity concept is but one of the latest innovations to be utilized in recreation carrying capacity research. It is of prime concern in today's analysis of management tools, particularly in the overall framework of recreation planning and management.

The purpose of this portion of the thesis is to review the available literature so as to provide an understanding of the social impact problems associated with managing a national park resource through the use of social capacities. It will accomplish this by briefly looking at the history of the social carrying capacity concept, presenting a conceptual framework for carrying capacity, and identifying some of the social impact parameters involved. It then describes the relationships that exist between amount of use and social and environmental impact parameters.

B. History

Attempts to establish social carrying capacities for natural areas has intrigued, mystified, and burdened managers and researchers for the past twenty-five years. Wagar (1964 p. 6) defined carrying capacity as, "the level of recreational use an area can withstand while providing a sustained quality of recreation". Implicit in this definition, as well as other writings of the time, was the recognition of at least two components of carrying capacity: a quality environment and a quality recreation experience (Graefe et al. 1984).

There has long been a concern with the potential detrimental effects of recreation use on resource values and visitor experiences. Initially such concerns arose in areas that were described as predominantly natural, where changes caused by recreation use took away from the primitive landscape (Stankey and McCool 1984). As early as 1942, this concern was expressed as a need to keep use "within the carrying capacity or 'recreational saturation point,' defined as, "the maximum extent of the highest type of recreational use which a wilderness can receive, consistent with its long term preservation" (Sumner 1942 p. 16).

Such early concerns had strong biological connotations, being directed primarily at the maintenance of naturally occurring conditions. Yet it was also apparent that the kind of recreation experience typically associated with natural backcountry areas would be lost unless some level of control was imposed upon the growing numbers of people entering the areas. These concerns reflected an appreciation that unconstrained use of backcountry areas could threaten the salient experiential qualities of primitive recreation opportunities (Stankey and McCool 1984).

Wagar's (1964) monograph 'The Carrying Capacity of Wildlands for Recreation' explored more thoroughly, in a hypothetical fashion, the linkages between the different aspects of recreation experience and use contacts. In a discussion of *crowding and recreation quality*, Wagar hypothesized that the relationship between crowding and recreation satisfaction will vary in terms of the specific activities in which the individual participates and the kinds of needs or desires that the activity is to fulfill. "The effects of crowding on the satisfaction derived from a specific activity can be evaluated by considering the specific needs that ...

motivate it" (Wagar 1964 p. 6).

Thus, from the inception of carrying capacity research, the fundamental premise was that the relationship between use and recreation quality depended upon the motives underlying the participation (Stankey and McCool 1984). It was also recognized in the evolution of the carrying capacity concept that the relationship between satisfaction and use was a function of more than the numbers of other people encountered. Lucas (1964) reported that the type of use encountered, rather than the amount, was the critical factor in any decision regarding an area's capacity. In this way, Lucas showed that different types of users seek different experiences, and that the role of different types and numbers of encounters in those experiences varied.

The first decade of carrying capacity research culminated with two important papers which helped to sort out and refine the components of resource capacity. Lime and Stankey (1971), identified the importance of establishing management objectives in the carrying capacity process. They also stated that identifying which public for whom to manage is an important decision in this process (i.e., the understanding of visitors' attitudes, motivations, and satisfactions). Finally, Frissel and Stankey (1972) outlined the importance of managing for changes in environmental and social conditions, not just absolute visitor numbers, and managing for those desired conditions. In doing this, researchers were telling park and recreation managers that carrying capacity is not an absolute value waiting to be discovered, but is rather a range of values which must be related to specific management objectives for a given area.

More recently, the carrying capacity concept has been advanced in more conceptually sophisticated and theoretically based writings (e.g., Heberlein and Shelby 1977; Heberlein 1977; Ditton et al. 1983; Grammon 1982; Shelby et al. 1983; Vaske et al. 1982,1983; Absher and Lee 1981). Almost all relevant articles agree that carrying capacity is a management system directed towards the maintenance or restoration of ecological and social conditions defined by a range of values that must be related to specific management objectives for a given area; carrying capacity is not a system directed toward the manipulation of use levels

per se. A definition reflecting current thinking suggests that social capacity refers to impacts which impair or alter human experiences. Social carrying capacity then is the level of use beyond which experience parameters exceed acceptable levels specified by evaluative standards.

C. Conceptual Framework for Carrying Capacity

Sorting out the range of variables which influence how people perceive a recreation experience requires an initial understanding of recreation participation and the motivation behind that participation. Motivations are generally defined in terms of the causes or why of behavior (Berkowitz 1969; Weiner 1973). Studies have used a variety of approaches and terms to examine recreation motivations and two related concepts, expectancy and norms, are particulary relevant to social carrying capacity.

According to expectancy theory, people engage in recreation activities with the expectation that their actions will lead to certain rewards (Vroom 1964; Driver and Tocher 1970). The specific expectations people have for a given experience are influenced by individual and environmental factors such as the amount and type of previous experience, the degree of communication with others, situational variables, and personality characteristics (Schreyer and Roggenbuck 1978). Research related to expectancy theory provides several conclusions for the examination of social carrying capacity. First, most people participate in recreation activities to satisfy multiple expectations (Hendee 1974). The range of expectations considered has extended from the basic dichotomy of intrinsic versus extrinsic motivations to extensive lists of psychological outcomes or needs (Driver and Brown 1978). Second, because the essence of recreation is choice, the motivations for participating in a given activity may vary considerably. Certain expectations tend to be associated with particular activities, but considerable variation in expectations may be found among individuals engaged in the same activity, or using the same environment, or even within a single individual at different times (Shreyer and Roggenbuck 1978; Graefe 1981).

Some studies have examined specific expectations from a normative perspective. Norms refer to standards for evaluating situations or people as good or bad, better or worse

(Cancian 1975). When these standards are shared by the members of a social group, the norm can be labelled a **social norm**. Thus, social norms are shared behavioral expectations of what people think "should" happen in a given situation.

While norms are usually used to describe shared standards, individuals are also active in creating their own personal norms. "Personal norms ... signify the self-expectations for specific action in particular situations that are constructed by the individual" (Schwartz 1977 p. 277). In relation to carrying capacity, normative models have focused on assessment of visitor perceptions of appropriate amounts of use (i.e., contact preference norms).

The relevance of expectations and norms to social carrying capacity lies in their ability to explain visitor evaluation of quality recreation experiences (Graefe et al. 1984). Most conceptual approaches to expectancy theory interpret the ways in which experience evaluations occur by comparing preferred situations to those actually encountered. Examples of these conceptual approached or theories include; 1) **discrepancy theory**, where visitors compare the perceived outcome they receive from an experience with the rewards they expect to receive (Schreyer and Roggenbuck 1978); 2) **social interference**, a negative evaluation caused by incompatibilities between a given level of physical density and the valued psychological goals or expectations a person holds for an experience; and 3) **stimulus overload**, where perceptions of crowding occur when the level of social interaction exceeds that desired by the individual (Gramann 1982). All of these conceptual models converge on the notion that understanding quality in the recreation experience requires an initial understanding of the goals or types of experience sought by visitors.

D. Identification of Social Impact Parameters

Social carrying capacity research has progressed from an initial emphasis on the effects of user numbers to investigations of the social, personal, and situational factors affecting density evaluation (Altmann 1975; Gramann 1982). Studies show that there is no single predictable response of visitors to varying use levels. Rather, visitors are affected by a series of interrelated impacts which result from recreation use of natural areas. Recreation use

leads to tangible outcomes like contacts between visitors and impacts on the natural environment. These social and natural impacts in turn can lead to a variety of perceptual and behavioral responses by the visitors.

Perceptions of Crowding and Dissatisfaction

Many investigations have shown a direct, positive, linear relationship between the number of users in an area and the rate of contacts between individuals (Heberlein and Vaske 1977; Shelby 1980; Absher and Lee 1981). The consequences of this increased interaction usually include increased perceptions of crowding and decreased visitor satisfactions (Bultena et al. 1981; Hammitt et al. 1982; Shelby et al. 1983).

The distinction between density and crowding has been advanced by many authors (Stokols 1972; Stockdale 1978; Altmann 1975). Density (physical density) refers to the number of individuals in a particular setting. Crowding, on the other hand, is a value judgement that specifies that there are too many people; it is the negative evaluation of a certain density. Negative evaluation may occur when the presence of others in a recreation setting interferes with goal achievement or creates a level of social stimulation which exceeds that desired by an individual (Gramann 1982). Thus, whether or not an area is crowded is a subjective judgement of an individual, not an objective fact. Consequently, crowding as a psychological judgement will vary across individuals depending upon a variety of social, psychological, and situational variables (Heberlein 1977; Schreyer and Roggenbuck 1978; Absher and Lee 1981).

Perceptions of Resource Impacts

Although previous research has emphasized perceptions of crowding and user dissatisfaction, other impacts on the recreation experience have also been associated with use levels. Recreation experiences may be influenced more by the perceptions of human impacts on the environment than by the presence of large numbers of other visitors (Stankey 1973; Lee 1977). Lucas (1979) suggests that there are two aspects to impact perception: 1) the

perceived importance of impact conditions relative to other aspects of the setting; and 2) the evaluation that a given condition is desirable or undesirable. Simple recognition of an impact condition might be added as a third component which is prerequisite to the evaluation of importance and desirability. Resource impacts can also be recognized or unrecognized by park visitors (Cole and Benedict 1983). If recognized the effects may be minimal if the condition is not regarded as undesirable. Even it an undesirable impact is noted, it may have little effect on visitor perceptions or enjoyment if the condition is unimportant to the recreationist.

Conflict Between Users

The potential for conflicts between users also increases with increasing use levels. Conflict represents a special case of user dissatisfaction where the recreationist attributes the source of goal interference to the behavior of others. This view of conflict is consistent with both the discrepancy theory and social interference models; when discrepancies exist between desired goals and actual outcomes, overall satisfaction declines (Graefe et al. 1984). The extent of conflict varies according to the importance of the goal being obstructed (i.e., people with specific expectations are more conflict prone than those with undefined or very general expectations). Most previous literature dealing with conflicts has focused upon assymetrical relationships between different activity groups (Lime 1975; Gr[illegible]mann and Burdge 1981). Assymetrical conflict exists when one type of user feels conflict resulting from the presence of a second type of user, though the reverse does not hold true. Conflict within activities can also result, especially when recreationists with different behavioral standards (norms) interact with each other. The extent of the conflict in influenced by the degree to which various user groups perceive each other as dissimilar.

Changes in Attitudes and Behavior

Perceptions of crowding, human impacts, and conflict, may not always occur however, because visitor responses to given situations depend upon their individual expectations and norms (Graefe et al. 1984). People may use varying coping strategies to

reduce or eliminate the negative effects of visitor densities. Several studies have suggested, for example, that individuals may modify their expectations and preferences as a way of reducing the negative effects of perceived crowding (Altmann 1975; Gramann 1982; Ditton et al. 1983). When visitors modify their normative standards to compensate for increasing use levels, the end result is a change in the characteristics of the recreation experience to be found in a given area. Current visitors to a heavily used area, then, may be as satisfied as visitors five to ten years ago when use levels were much lower, but they are receiving a different type of experience (Graefe et al. 1984).

Recreationists may also change their behavioral patterns to compensate for rising density levels. A shift in behavioral patterns in response to changes occurring in the 'environment' has been called **recreation displacement** (Neilson and Endo 1977; Schreyer 1979). Schreyer (1979) suggests that this change in behavior results when the individual; 1) perceives that the desired outcomes of an experience are not attained, and 2) does not wish to reemphasize other aspects of the behavior. Behavioral changes can involve a simple change in the frequency of participation within a particular setting (Schreyer 1979). In the Pelee situation for example, an individual might alter his or her frequency of birding, or may simply choose to visit when the probability of lower visitor numbers in the park is greatest (i.e., weekdays). People most sensitive to user densities may stop visiting a particular resource altogether when other behavioral or attitudinal adjustments fail to provide the desired experience. These displaced recreationists may then seek out a substitute activity and/or setting and be replaced by visitors who are more tolerant of the higher density use levels.

E. Relationships Between Amount of Use and Impact Parameters

The hypothesis that increased visitor densities lead to a decrease in the quality of the visitor experience has stimulated many studies focusing upon the relationships between use levels and various impact parameters. Most of these studies have attempted to predict either visitor satisfaction or perceived crowding from user density. More recent work has focused upon user perceptions of resource impacts and the behavioral adjustments of visitors in

response to environmental change and/or perceived crowding.

Satisfaction Model

Researchers and managers have consistently argued that "the goal of recreation management is to maximize user satisfactions" (Lucas and Stankey 1974 p. 52). Despite this argument, existing research has failed to document empirically the relationship between use levels and visitor satisfaction necessary for the development of evaluative standards and the setting of capacity limits.

Several economists (Alldredge 1972; Fisher and Krutilla 1972) developed theoretical models for determining social carrying capacity. The model described by Alldredge (1972) assumed that enjoyment from a recreation experience was inversely and solely correlated (almost linearly) to the number of people present.

Some empirical research (Ciccetti and Smith 1973; Stankey 1973; Manning and Ciali 1980) supports this model's premise that satisfaction declines as use levels increase. These studies however, examine the effects of **hypothetical densities** on user perceptions of the experience. That is, respondents were asked how they would respond to a variety of hypothetical density levels. Subsequent investigations which examined the bivariate correlation between actual density and satisfaction failed to confirm the predicted negative relationship (Ditton et al. 1982; Becker 1981; Shelby and Colvin 1982; Heberlein and Vaske 1977). Therefore, recreationists seemed to be just as satisfied on high use days as they were on low use days.

Several explanations for this situation have been suggested. The first suggests that it is not surprising to find many people reporting high satisfactions with their leisure activities because they are freely chosen (Heberlein and Vaske 1977). Cheek and Burch (1976) suggest that because leisure is spontaneous and connotates a sense of freedom, some people may have no preconceived expectations to fulfill or their expectations are fluid and adjustable. Schreyer (1979) elaborates on the psychological mechanisms that may yield reports of high satisfaction; 1) individuals may **shift their perceptions** in order to maintain the desired experience; 2)

individuals may **shift their priorities** of expectations to maintain satisfaction; or 3) individuals may **change their behavior** to achieve preferred outcomes.

All of these potential explanations are consistent with the conceptual framework discussed earlier. Satisfaction, then, cannot be predicted from user density because visitors' multiple expectations may be affected in different ways by use levels and because changes in attitudes and/or behavior may cause high satisfactions even under varying levels of user density (Graefe et al. 1984).

The Satisfaction Model, then, must be reassessed in favor of more complex formulations which incorporate normative, motivational, and social organizational aspects.

Perceived Crowding Model

Crowding research in outdoor recreation has proceeded from a primary interest in the effects of physical density to an increased focus on the personal factors affecting the evaluations of density (Gramann 1982). Early research on recreation crowding was heavily influenced by theoretical models of resource carrying capacity (Stankey 1973). More recently, there has been an emergence of social psychological-based studies of recreational crowding (Schreyer and Roggenbuck 1978; Ditton et al. 1983; Shelby et al. 1983; Absher and Lee 1981).

The basic crowding model examined in many studies (e.g., Heberlein and Vaske 1977) predicts that use levels influence the number of contacts between visitors, and that contacts in turn influence perceived crowding. Numerous recent studies present data on the relationships between actual density and perceived crowding (Lee 1975; Absher and Lee 1981; Ditton et al. 1982; Gramann and Burdge 1981). A majority of these investigations reported positive, significant effects; as use levels increased, recreationists were more likely to evaluate the experience as crowded. The magnitude of the observed correlations in these studies however, only averaged .21 (Graefe et al. 1984). This suggests that the relationship between actual density and perceived crowding may be caused by the individuals' perceptions of the experience.

Research related to the effects of perceived contacts, rather than actual density, on perceptions of crowding reveals stronger and more consistent levels of association with an average correlation of .34 (Graefe et al. 1984). These same investigations, however, also state that crowding perceptions can be predicted more accurately when user contact variables are examined in combination with other measure like expectations, preferences, prior experience, and visitor commitment to the activity. Therefore, crowding perceptions are influenced by use densities in the recreation setting, but the relationship is strengthened by a variety of other situational and subjective variables.

F. Factors Affecting Use and Impact Relationships

The findings summarized in the previous section demonstrate that the various impacts of increasing use levels on the recreation experience can only be partially explained as a function of use level. The following discussion elaborates on some of the factors which affect the use/impact relationships. The discussion is broken into three sections and centers on individual variations in tolerances to impacts, activity specific influences, and site specific influences.

Visitor Characteristics

Individuals vary in their responses to increasing recreation use. In recognition of the diverse, multidimensional nature of expectations and motivations among recreationists, many researchers and resource managers alike have differentiated users into relatively homogeneous groups. These groups or typologies have been developed to classify participants in different recreation activities, as well as participants within a single activity.

Several studies have classified and compared groups or individuals which are distinct from a management standpoint (i.e., day vs. overnight users or in the case of Point Pelee, birders vs. nonbirders). These groups are easily recognized as being different and can be treated as such in management policies.

Other user profile typologies result in groups which are not so easily recognizable from a management standpoint, but knowledge of their existence provides greater understanding of the diversity present in the aggregate groups of recreationists. Several investigations, for example, have compared experienced vs inexperienced visitors (Neilson and Endo 1977; Vaske et al. 1980), or categorized outdoor recreation participants according to their expectations or motives (Ditton et al. 1982). Bryan (1979), uses a more diverse set of criteria to identify activity types, and proposed a conceptual typology which arranged recreationists along a continuum ranging from beginner to specialist. This specialization continuum includes factors related to the amount of participation, skills, equipment and setting preferences, social group, and attitudes and values. These concepts have been useful in identifying different user typologies in other recreation studies examining fisherman (Dolsen 1985) and may prove to be so as well for bird watchers visiting Point Pelee.

Despite the efforts to understand diverse user types, it is difficult to summarize the tolerances of recreationists to impact. This is because different individuals apply different normative standards when evaluating the impacts created by the presence of others. Relatively few investigations have attempted to measure the specific tolerances of particular user groups to the various types of impacts. Those studies which have compared visitor types have not used a consistent classification system (Graefe et al. 1984).

A few generalizations regarding the varying tolerances of recreationist to impacts, however, can be made from research studies. These findings are summarized in Table II-1.

Activity Specific Influences

Given a basic tolerance level, the response of individuals to contacts with others may vary according to the types of activities and behaviors encountered. For example, a hiker may be quite tolerant of contacts with other hikers and extremely intolerant of contacts with off-road vehicles. The extent to which one type of use impacts another depends upon the social and personal norms visitors use to evaluate the appropriateness of specific behaviors (Graefe et al. 1984).

Table II-1. Synopsis of Sensitive Vs Tolerant User Groups

Sensitive	Tolerant	Citation
Fisherman	Other Water-related Sports	Heberlein and Vaske 1977
Small Groups	Large Groups	Stankey 1973
Frequent Participants	Infrequent Participants	Bryan 1979 Graefe 1981
Experienced Visitors	Inexperienced Visitors	Ditton et al. 1982 Hammitt et al. 1982 Neilson et al. 1977 Vaske et al. 1980 Bryan 1979
Specialists	Generalists	Bryan 1979
Nature/Solitude Seekers	Thrill Seekers	Absher and Lee 1981 Ditton et al. 1982 Schreyer and Roggenbuck 1978
Visitors to Undeveloped Recreation Areas	Visitors to Developed Recreation Areas	Gramann and Burdge 1984

(Modified from: Graefe et al. 1984)

Differences in responses to impacts have also been reported for encounters with groups of different sizes. Given the importance of solitude as a goal of participation for many individuals (Lee 1977), the presence of large parties may violate a small group social norm. In addition, since most backcountry users travel in small parties (Lime 1975; Stankey 1973,1980), larger groups stand out as being conspicuous.

Conflict results when individuals with contrasting standards of behavior (i.e., personal norms) interact (Jacob and Schreyer 1980). Such differences may exist among participants engaged in the same activity, as well as people participating in different activities. Conflicts also result when individuals who have specialized in a certain activity encounter recreationists participating in less intense activities. On a more conceptual basis, as the mode of experiencing an environment becomes more specific (focused), an individual produces more rigid definitions of what constitutes acceptable stimuli and is increasingly intolerant of external stimuli. Going from unfocused to focused is analogous to going from low conflict prone to high conflict prone modes of experience (Jacob and Schreyer 1980).

Such differences suggest that it is not enough to ask visitors how many contacts with recreationists they will tolerate. Instead, the answer depends on the types and perceived similarities of the visitor groups encountered (Graefe et al. 1984).

Site Specific Influences

Evaluations of recreation experiences are influenced by the characteristics of the environment and by users perceptions of the particular setting. Geographic features of the environment (e.g., winding trails) often help to reduce the number of contacts between visitors and so lessen the impact associated with increasing use levels.

Visitor reactions to contacts with others also vary depending upon the location of the encounter. Seeing others at a trailhead or on the trail, for example, generally had less impact than encounters at the campsite (Hendee et al. 1968; Stankey, 1973). Because visitors expected to see others at trailheads and access points, contacts at these locations had minimal impacts.

Once people start their trip however, different normative standards appear to be used in evaluating the appropriate level of encounter.

Many of the studies mentioned up to this point have dealt with recreation activities in relatively undeveloped recreation areas such as backcountry and wilderness areas. Social psychological factors in more heavily used recreation sites and/or smaller national parks involve factors distinctly different from those identified in wilderness areas, particularly as they relate to perceptions of crowding. Gramann and Burdge (1984) draw several conclusions that relate intensity of site development to perceptions of crowding and ultimately visitor satisfactions; 1) through a process of self-selection visitors to intensively developed recreation areas will tend to be more tolerant of high use densities. As a result, the type of psychological incompatibilities represented by goal-related crowding is probably less important in these areas than in wilderness or backcountry areas; 2) since use densities at heavily developed sites are typically high, constraints on physical movement may be more important determinants of crowding than in more lightly used areas; and 3) perceived crowding stemming from exposure to objectionable and/or threatening behavior should be found in intensively developed recreation sites. This is due to the high probability that such behavior will occur when large numbers of people congregate in one area.

In summary, it is apparent that different social and personal norms function to delineate behavior which groups and individuals perceive as appropriate in different recreation environments. As the importance of the particular place increases, visitors become more sensitive to recreation impacts and less tolerant of uses which are perceived to impair the area's natural attributes.

G. Conclusion

This chapter has attempted to summarize what is known about social carrying capacity, from a conceptual or theoretical viewpoint. Current research has shown that we have a reasonably complete picture of how the recreation experience may be impacted by

increasing use levels and why human responses vary under certain circumstances or as a result of certain intervening variables. The picture is not quite so clear however, when it comes to implementing these concepts and establishing actual capacities in the field.

There appears to be one basic and essential research question in the implementation of carrying capacity. What use patterns will result in a visitor experience that is consistent with impact standards (objectives) of a given area? In order to answer this question completely, it is necessary to have accurate data on the amount, type, and distribution of use as well as the appropriate impact parameters. This information should be more specific and more complete than it has been in past studies. Use measurements should document a wide range of manageable use characteristics including party size, length of stay, activities engaged in, and distribution of use. Impact measures should also be more specific, including: number of contacts of particular types, numbers of contacts at particular times or places, perceived crowding at particular locations, etc. This kind of information is very site-specific and is exactly what is required to proceed with management at the site level.

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III. Review of Ecological Impact Research Literature

A. Introduction

One of the most serious problems facing managers of recreation resources, and one which is closely tied with social impacts discusses in the previous chapter, is the paradox of protecting unique, rare, and uncommon ecosystems while providing for their recreation use. There is an inherent conflict in recreational planning, however, since impacts on the environment are inevitable but the extent and location of these impacts can be influenced by planners and managers.

Central to the problem is the fact that each ecosystem has an inherent optimum limit in its capacity to tolerate recreation use without irreversible degradation (Kuss and Graefe 1985). This notion of carrying capacity assumes that a maximum density (or saturation level of use) can be determined for each ecosystem in question.

Applications of the carrying capacity concept to the management of recreational use is not without difficulty since the dimensions of capacity include dynamic interactions of soil, plants, wildlife, habitat and environment, seasonal and temporal influences on these interactions, types of user activities that take place in these area, and the fact that capacity levels can be increased or decreased by different management actions.

The purpose of this chapter is to elaborate in some detail upon the ecological impacts associated with increasing visitation to recreation areas in general. The chapter begins with a short discussion on the types of impact studies that have been carried out to date, provides some insight into the types of impacts that occur in recreation areas, and finally discusses the ecological carrying capacity concept and its possible application in a resource management context.

B. Ecological Impact Methodologies

The results of any study are dependent upon the methodologies employed and thus an understanding of the associated methodological problems is essential if the current status of knowledge is to be fully appreciated. The cause and effect of environmental impacts are extremely difficult to identify for a number of reasons. Wall and Wright (1977) give four reasons that this is so. First, man has been living on and modifying the earth so that it is difficult to reconstruct the environment before the intervention of man, and thus establish baseline information against which to measure change. This problem is particularly apparent at Point Pelee, a recreation area where public use has existed for a long time making it difficult, if not impossible, to reconstruct the environment minus the effects caused by recreation.

A second difficulty relates to the problem of separating the role of man from the role of nature. Even without the intervention of man, the environment would not remain unchanged. This fact leads to further difficulties in establishing baseline measures. This problem is compounded since many recreational impacts are synonymous with normal environmental processes, with the exception that these processes are sped up by the intervention of man. An example of this concept, and one that is very important at Pelee, is weathering and erosion. Both are natural processes, but they can become major problems when compounded by man. The process remains unchanged, but the flows of energy are changed radically.

The third problem stems from spatial and temporal discontinuities between cause and effect. For example, the destruction of some key elements in an animal's habitat may lead to population declines throughout that animals range. In a temporal context, considerable time may pass before the full implications of an activity become apparent, but the animal has become reduced in number spatially never-the-less.

Finally, the complex interactions between different aspects of the environment make the overall impact almost impossible to measure. Changes in soil resulting from trampling by bird watchers may cause changes in vegetation composition which in turn may cause changes

in wildlife species diversity and number. In other words, primary impacts (i.e., trampling) give rise to secondary and tertiary impacts which in turn cause a host of successional repercussions throughout the entire ecosystem.

All of the above mentioned problems are inherent in all assessments of environmental impacts. There are a number of problems specific to the outdoor recreation question at Point Pelee, however. Outdoor recreation encompasses a wide variety of activities, each occurring at different times and with varying intensities, and taking place within different environmental ecosites. In addition, few recreation activity studies have attempted to measure both cause and effect at the same time (Wall and Wright 1977; Fulton 1980). While there are numerous visitor use studies from particular settings, carried out at both Point Pelee National Park and elsewhere, few detailed user studies have been undertaken in conjunction with ecological investigations. This lack of integration during the research process does not allow for a complete understanding of the precise nature of the environmental change and as a consequence, quantitative cause and effect relationships are seldom established.

Three major methods of studying the impacts of outdoor recreation are identified by Wall and Wright (1977). These include after-the-fact analysis, the monitoring of change through time, and simulation experiments. A majority of the studies found in the literature have been after-the-fact investigations. The basic assumption inherent in these investigations are that the study area was homogeneous before the introduction of the recreation activity and that there have not been any major changes in the environment since the area was made available to recreation users. Effects of recreation therefore, are the differences between impacted sites and the area adjacent to them.

The second methodology, monitoring changes overtime, allows for the simultaneous study of both cause (recreational use) and effect. Observations over a long period of time can be made and yield important information concerning types and rates of changes and/or speeds of recovery. An example of this type of methodology includes photo plots. The problem with this method however, is that not only is it costly and time consuming, but by the completion of the study environmental changes in the study area may not be reversible.

Simulation experiments using artificial tramplers provide results relating to predetermined measures of use intensity. These types of studies offer the advantage of applying selected intensities of impacts that occur on recreation sites, control variability in plot characteristics so that plots can be relatively small in size and few in number, and allow for a variety of treatments to be applied that would otherwise be costly and detrimental to the developed recreation site. The major difficulty however, is to accurately simulate human use. The human foot applies both vertical forces and twisting motions to the ground.

Each of these methodologies have their strengths and weaknesses. Results from studies carried out using these different methodologies are difficult to compare making it important to consider the assumptions and limitations of each research study under review. The following sections of this chapter review the environmental components: soils, vegetation, and wildlife. There are many other environmental components in addition to these, but for the purposes of this study the focus will be on these three.

C. Ecological Impact Parameters

Research on the ecological impacts of outdoor recreation has focused upon the identification of relationships between recreation use and various components of the natural resource. Very little research has been done on the ecological impacts of bird watchers and we can only assume that their impacts are the same, if not more extensive than those created by any other outdoor recreation user type. In general, studies suggest that recreation use most strongly affects soil erosion and compaction, vegetation loss and replacement by non-native plant species, and wildlife behavior and population levels (Stankey 1980).

Vegetation and Soil Impacts

Recreation use of natural areas affect soils and vegetation in a variety of ways. Tivy (1972) suggests that the most typical vegetation impacts include direct reduction in plant growth and cover, decreases in the density of herbs, shrubs, and tree seedlings, and changes in species composition and diversity. This statement should be qualified however, by adding that

the relationship between trampling and vegetation cover is extremely complex and depends upon the species involved (Wall and Wright 1977). Associated soil changes that can be attributed to the decline in plant vigor include the increase in soil compaction, a reduction in organic matter content, a decrease in infiltration rates, and an increase in runoff and erosion (Cole and Schreiner 1981; Tivy 1972).

Available literature seems to indicate that the relationship between use intensities and vegetation cover is curvilinear, with even low use resulting in substantial loss in the original vegetation (Frissel and Duncan 1965; Merriam and Smith 1974; Cole 1982). A more precise, long-term study carried out by LaPage (1967) substantiates the above statement, but went on to say that there is recovery and that the rate of decline with use tapers off over time. A major shift in vegetation composition usually follows the initial loss in cover to that of more resistant species (Verburg 1977). Several authors indicate that the extent of impact is often closely related to inadequate trail design, location, and maintenance than to overuse (Helgath 1975; Wall and Wright 1977; Bratton et al. 1977; Cole 1985). Bratton et al. (1977) further suggested that the intensity of damage is primarily a function of site factors and type of use, while the area of damage is a function of numbers of users. This certainly seems to be the case at Point Pelee where bird watchers come to the park, a fragile ecosystem, in great numbers to observe different bird species throughout the park area.

Response of plants to recreation use appears to be strongly associated to the morphological characteristics of the plant. Species which appear to be most resistant to impacts in forested ecosites combine the characteristics of being woody, prostate in growth habit, regenerate by layering, and have the ability to grow in dry or stressed environments where competition is reduced (del Moral 1979). Highly sensitive plants have soft, delicate leaves, a single exposed perennating organ, are active most of the use season, and have adapted to wet or moist habitats where soils are easily compacted and competition is often severe (del Moral 1979). Since most of the plant species found in the Carolinian forest ecosystem of Point Pelee fall within this sensitive classification, the effects of birding activities are greater than in most other ecosystems in the Pelee area.

Morphological resistance seems to be dependent upon site or habitat conditions, since soil moisture greatly increases the susceptibility of ecosystem damage to trampling (Vaske et al. 1983). Plants inhabiting sites having high soil moisture, such as those in the wetlands and marshes of Point Pelee, are easily damaged even by minimal use.

Some researchers (Liddle 1975a) have proposed that the tolerance of plant communities to wear is strongly related to primary productivity and that this relationship may be used to predict vulnerability. Others however, (Kellomaki and Saastamoinen 1975) found that plants growing under a deciduous forest (such as there is at Pelee) on sites having either low or high fertility are more susceptible to damage than those found on sites of moderate fertility.

Dense soils, created by trampling, restrict both the rate and extent of root elongation. The effects have been shown to be related to both aeration and soil strength resistance to penetration (Marshal and Holmes 1979). Thus changes in soil properties reflected by bulk density appear to select for species with greater tolerance to moisture and oxygen stress, as well as those morphologically adapted to highly compressed soils.

Wildlife Impacts

Information on the effects of outdoor recreation activities on wildlife is relatively incomplete. Findings are often mixed and animal responses to human intruders are extremely varied, even within a single species (Ream 1980).

Impacts of recreation on wildlife can be a direct result of harassment of animals or can occur indirectly through loss of habitat, food supply, or productivity. Direct wildlife harassment, as defined by Ream (1980 p. 153) includes, "events which cause excitement and/or stress, disturbance of essential activities, severe exertion, displacement, and sometimes death." Harassment can be either intentional or unintentional. Several authors suggest that the major impacts result from recreationists in "nonconsumptive" activities who unknowingly produce stressful situations for wildlife (Graham 1980; Ream 1980; Wilkes 1977).

Studies examining the indirect effects of human activities on smaller wildlife behavior and population levels near campsites and trails document a loss of habitat as a response to human interference (Mahoney 1976; Garton et al. 1977a,1977b). Ream (1980 p. 162) suggests that, "big game species tend to be more affected by direct interaction, whereas rodents, birds, amphibians, reptiles, and insects are affected more by indirect impacts such as the modification of the structure of the vegetation." Since a majority of the wildlife resources found at Point Pelee National Park are as those described previously and most impacts seem to be caused indirectly through man and nature induced vegetation changes, the impacts of bird watchers are potentially great.

Human disturbance has been shown to result in reduced productivity rates. Research on birds suggest that disturbing nests caused adults to fly off, leaving eggs vulnerable to predation or hatch failure (Hunt 1972; Bart 1977). For young birds, disturbance can lead to premature flight and increased injury and predation (Garber 1972). Similar effects have been found for other bird species. For the more well studied species such as osprey and eagles, some studies have suggested that nest disturbance had no effect on reproductive success (Mathisen 1968).

Research has identified a variety of factors which influence both the frequency of human-wildlife encounters and the response or vulnerability of wildlife to these encounters. These factors include the wildlife species and its feeding and breeding characteristics: the type, degree, and length of disturbance, and the season and/or weather conditions (Wall and Wright 1977). Ream (1980 p. 153) notes that, "well-fed, healthy animals with ample refuge from disturbance can withstand harassment more than wildlife already under stress from severe weather, malnutrition, parasite loads, migration, birth or nesting, or inadequate security areas."

D. Conclusion

Overall, the available empirical evidence highlights the complexity involved in understanding recreation impacts on both the physical environment and specific wildlife populations. Relatively low numbers of visitors can seriously disrupt the amount of vegetation cover in given areas and result in major erosional problems (Vaske et al. 1983). Among certain species of wildlife, encounters with even a few humans, particularly during critical periods of time, can alter behavior patterns and influence reproductive and/or survival rates. These findings tend to stress the importance of recognizing the inherent differences between species and resource characteristics when evaluating the impacts associated with bird watching activities.

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IV. Paper I: Bird Watchers At Point Pelee National Park: Demographic Profiles, Activity Characteristics, And Resource Familiarity

A. Introduction

Bird watching is probably the fastest growing wildlife-related recreation activity in North America (Butler 1984; Harrison 1976; Scofield 1978). Participation in Canada and the United States has increased from combined estimates of eight million in 1965 to participation currently of twenty million people each year (Filion et al. 1983; Kellert 1985; Lyons 1982). Conservative estimates of economic expenditures associated with bird watching in North America are in excess of two billion dollars annually (USDI 1982; Filion et al. 1983) with the major field guides alone collectively selling about one million copies a year. Despite the popularity and visibility of this activity, the participants themselves are generally poorly understood and subject to substantial misconceptions. As a consequence, their needs and expectations are often poorly accommodated in recreation settings.

Bird watching as a recreation activity at Point Pelee National Park has been growing in popularity since the turn of the century. It has now become one of the most famous locations in the world for watching the migration of birds during the spring months of April and May (Harrison 1976). Presently some 60,000 to 80,000 gate visits of bird watchers are recorded during the spring passerine migration each year involving more than 20,000 individual visitors. On a busy day during the peak of the migration 6,000 people can be found within the confines of the park's 6.2 square kilometer landbase. Of these, 70% (4,200 individuals) can be found at any one time in the Tip Area (an area of only 1.5 square kilometers at the end of the peninsula).

Bird watching has traditionally been seen as a nonconsumptive wildlife-related recreation activity in which there is little or no impact on the natural resource base. In the past ten years however, in specified locations (of which Point Pelee is one), the activity has begun to place stress on both the birds being sought after and the associated habitats (Graham 1980; Webster 1980; Wilkes 1977). In addition to the concerns for ecological

impacts, the question of social impacts has arisen, especially with planners and managers placing increasing emphasis on experiential objectives in an attempt to ensure the provision of a quality recreation experience. Accordingly, there is a need to understand the satisfaction and motivational variables associated with birding and how they are affected by the increasing numbers of people participating in the activity. The ability to address some of these issues depends upon the success of achieving a better and more thorough understanding of the specific user group. This is important from a wildlife conservation standpoint as bird watchers are seen as being representative of the new principal wave of wildlife guardians and a sophisticated political force who will continue, for the foreseeable future, to be the leaders in the North American conservation movement (Butler 1984).

A number of studies examining bird watchers have been carried out by Environment Canada, Parks at Point Pelee National Park in an attempt to better understand birding activities and the impacts they create. Visitor survey studies carried out in the past (Grant 1975; Grant and Wall 1977) examined sociodemographics and satisfaction variables of park visitors to Point Pelee. These, however, examined summer visitors and did not look specifically at bird watchers, although birding as a recreation activity was included for the study periods involved. More recently efforts have been made to develop birder management strategies and plans (Fulton 1980; Mouland et al. 1986,1985). These plans dealt specifically with the spring bird watcher user group at Pelee, identifying visitor experience and resource protection concerns. They lacked, however, the detailed visitor information that is required to make effective management decisions.

Successful management of bird watchers, therefore, requires a better understanding of this unique park user group: who they are and what they know about the park resources. Graefe et al. (1984 p. 503) state, "effective planning for the management of recreation use in any setting requires the knowledge as to the amounts, types, and distributions of use, as well as the appropriate impact parameters. This information has to be more complete than it has been in past studies. Use measures of recreation activities should document a wide range of manageable use characteristics including party size, length of stay, activities engaged in." This

information is very site specific and is precisely what is required to proceed with management and planning of the more important problems at the site level, namely that of ecological and social impacts created by bird watchers at Point Pelee National Park. This portion of the bird watcher study at Point Pelee National Park was carried out in an attempt to address these needs.

B. Study Area Location and Description

Point Pelee National Park is a day-use park located in Essex County of southern Ontario, 80 kilometers southwest of the large urban center of Windsor-Detroit (Figure I-1). A detailed description of the park and its resources was provided in Part I.

C. Methodology

The methodological procedures used in this portion of the study were based upon the need to gather data on the demographic profile, activity characteristics, and resource familiarization of bird watchers at Point Pelee National Park to meet the objectives put forth in Part I. These considerations, along with the concerns for validity and reliability, guided the selection and development of the data gathering techniques to be reviewed in this section. It should be reemphasized that this study was carried out in an exploratory style focusing on the initial phases of bird watcher identification in the hopes of leading to a better understanding of this unique and complex recreation user group.

Interview Questionnaire Methodology

The structured personal interview questionnaire gathered a wide variety of information regarding bird watcher profile demographics, birding activities, previous birding experience, and user attitudes and preferences as they pertained to the birding activity and other birders at Point Pelee National Park. A copy of the questionnaire is presented in Appendix A.

There were several advantages to utilizing the structured on-site personal interview questionnaire methodology. The prime advantage of the interview technique is its flexibility

when gathering data (McGaw and Watson 1976). It provided the ability to obtain a representative sample of the birder population, to obtain a more full and detailed answer through question clarification and probing, to develop a rapport with the respondent which ensured participation to the completion of the questionnaire, and finally, the interview technique allowed for the revelation of information from the participant which may be complex and/or emotionally laden (Babbie 1979; Kidder 1981; Leedy 1980). On-site interviews also allowed the interviewer to control who answered the questionnaire. This is unlike self-administered questionnaires where it is impossible to control the number of people who provide input into answering a single question.

There are also several disadvantages associated with the use of the interview technique. The majority of these problems are associated with bias which may arise from the interview process itself. Interviewer bias (reliability error) occurs when the interviewer unknowingly influences the respondent's answer by only recording those responses he or she feels are worthy of recording, or through systematic differences in questioning technique from interviewer to interviewer (Kidder 1981; Leedy 1980). The best means of combatting the bias associated with the interview technique is by making all those involved in the interviewing aware of the areas in which bias may occur. Since there were a number of interviewers on the research team at Point Pelee, briefing sessions were carried out prior to and at various times throughout the field study. This helped to ensure that interview questions were asked and responses recorded in a similar fashion.

Questionnaire Development

The development of the final questionnaire form (Appendix A) followed several stages. The first involved the selection of question type and mode, the second question wording, third writing the first draft of the questionnaire, the fourth stage involved pre-testing the instrument, and finally questionnaire revision.

There are two broad categories into which questions contained in this interview questionnaire fell: open and closed-ended. Open-ended (or free answer) questions are less structured items and allow the respondent to provide the answer to the question

without reference to alternative answers. Closed-ended (or fixed answer) questions are highly structured items and ask the respondent to select his or her answer from a list of alternatives provided by the interviewer (McGaw and Watson 1976).

Both modes of questions have advantages and disadvantages which influence when and where they should be used. Open-ended questions raise an issue and allow the respondent to answer in his/her own terms, thereby generating the widest possible number of responses that might otherwise be missed in fixed answer questions.

The major disadvantage of open-ended questions is that they produce responses which may follow many different dimensions creating problems and difficulties in the post-coding of data into quantifiable terms. The task of post-coding involved grouping the total range of responses for each question into definable groups, dependent upon the dimensions the responses take. The ranges of responses are then classified into categories for the purpose of data analysis. During this process there is always the chance of grouping or classifying responses incorrectly, thus losing important responses.

Another problem with the open-ended questions is that respondents may only speak of what is uppermost in mind at the time of the interview. This is an important methodological constraint, but one that can be resolved through probing by the interviewer, even though this may increase the risk of interview bias.

Closed-ended questions offer the respondent a choice among specific alternatives, thereby ensuring that the responses fall along the desired dimensions. This type of question requires very little writing on the interview form and is simple to quantify as the interviewer has only to check-off the pre-coded answer selected by the respondent. Therefore, the advantage of the closed-ended question lies in the ease of administration and analysis. The disadvantages, however, are that the ease of administration produces a lack of spontaneity in the responses, possibly introducing bias by offering alternatives the respondent may not have thought of him/herself or omitting responses that may otherwise have become evident.

In summary, then, open and closed-ended questions each serve different purposes and one type cannot be termed "better" than the other. This study used both types. For the purposes of this study, which demanded exploration into the likes and dislikes of the bird watcher user groups in a limited time period, open-ended questions were utilized to provide the most diverse range of responses possible (refer to questions 5 and 7, Appendix A). Closed-ended questions were used to gather factual data relating to socio-demographics and activity characteristics and on attitudinal data pertaining to feelings about the birding activity and other birders at Pelee.

Question wording is extremely important when one is dealing with a cross-section of people in society. In designing questions for respondents, wording had to be put in such a way so that it was clearly understood by all who answered. To accomplish this, all possible ambiguity had to be removed so that each respondent is answering the same question. In summary, a question is properly worded (and is valid) if the answer tells us what it is we want to know.

The first draft of the interview questionnaire included an extensive array of attitudinal, visitor profile demographic, and activity questions as they pertained to bird watching activities of Point Pelee National Park. Many of these were obtained from backcountry wilderness study questionnaires and modified to suit the needs of this study.

A pretest, a tryout of the questionnaire to see how it works and whether changes are necessary before the start of the full-scale study (Kidder 1981), was then carried out. Due to the limitations of time and access to the actual study site, a true pretest in the field could not be carried out. Pretesting of the interview instrument was restricted to consultation with and critical review by professors experienced in questionnaire formulation and to testing the instrument on university students. This process led to the modification of question sequencing and clarification of question wording.

A major revision of the interview questionnaire had to be carried out upon arrival at Point Pelee because of park managers' concerns for questionnaire length and the possibility of intrusion of the visitors' park experience. This revision resulted in the

exclusion of all those questions that were not absolutely essential to the success of the study and resulted in the questionnaire presented in Appendix A.

Sample and Sampling Techniques

The population from which the sample was drawn were the bird watchers visiting Point Pelee National Park during the study period of May 3 to May 20, 1985. Interviews were carried out on-site at Point Pelee in a number of locations throughout the park, with a majority being carried out at the Tip Concession (Figure I-2). The concession area at the Tip is a drop-off point and natural gathering area for park visitors before and after birding activities as they wait for the public transportation system to return them to the Visitor Center. Bird watchers in the vicinity of the Tip Concession who were not actively engaged in the birding activity were chosen at random and asked to take part in a short personal interview. In some cases, especially during times when birder turnover was very low, all bird watchers at the Tip Concession were interviewed.

Interviews were conducted from approximately 7:00 a.m. to 3:00 p.m. each day Wednesday to Sunday for the study period described above. Monday and Tuesday of each week, with the exception of the long-weekend in May were given to the study team members as days of rest. This provided a total of 14 field days, of which 8 were weekdays and 6 were weekends.

Four members of the study team were located at the Tip Concession area during the field days mentioned above. The four person study team attempted to complete 60 interviews per day for each field day. This goal was surpassed, with an average of 72 interviews being carried out each field day for a total sample size of 1005.

Interview team members were assigned two picnic tables each from which to sample their prospective respondent. At the beginning of each sampling day (7:00 a.m.) interview team members chose the second individual or group of individuals to sit at that table. The interviewers approached the intended respondent(s), introduced themselves as a member of the research team, and asked the respondent if they would take part in a short interview. If the respondent agreed, the interview began. Upon completion of an

interview, the research team member approached the next individual birder or group of individuals to sit at one of the two tables and repeated the process described above. This process continued until the end of the sampling period (3:00 p.m.) or until such times as the predetermined number of interviews had been obtained. In the event that a potential respondent refused to take part in the interview, the interviewer would thank the person for his/her time, wish them a good day and continue on to the next predetermined table.

Group representative bias, that sampling bias associated with sampling a member (spokesperson) of an activity group who is not representative of the other members of the group, was a factor that had to be considered during the respondent selection process. Holland et al. (1986), in a study examining the existence of this bias and its effects upon research study results, found that no group representative bias was found to exist when individuals members of a group are similar in experience, attitude, satisfaction, and pereceptions of crowding. They concluded that group type was the key element to consider when checking for group representative bias. Group representative bias was found to occur most often when interviewing individuals of family groups. While 39% of the interviews carried out during the study at Pelee involved family groups, a majority (58.2%) of the interview respondents came as individuals or with others of like interests, expectations, experiences, and attitudes (i.e., bird clubs, groups of friends, and organized groups). For this reason the potential bias associated with sampling individuals not representative of the group to which they are a member was deemed by this researcher to be relatively insignificant, although the possibility of its existence and influence upon study results is acknowledged.

Other areas in the park where interviews were carried out included the Marsh Boardwalk Picnic Area, DeLaurier Trail Picnic Area, and the Visitor Center Public Transportation pick-up area (Figure I-2). The actual number of interviews carried out by location in the park is presented in Table IV-1.

TABLE IV-1. Number of Interviews Conducted by Sample Location at Point Pelee National Park - Spring, 1985

Location	Number of Interviews	Percent of Total
DeLaurier Trail	26	2.6
Marsh Boardwalk	8	0.8
Tip Concession	922	91.7
Train	49	4.9
Total	**1005**	**100.0**

Participants seemed to enjoy taking part in the interview as they felt that their opinions were important to the successful management of the park and its resources. Only two park visitors refused to take part in the interview process and in one of these instances the person returned at a later time in the day to complete the interview questionnaire.

Data Preparation and Analysis

The raw interview questionnaire data was for the most part pre-coded and only required numeric transfer onto coding sheets and to be entered into a computer data file. Before this entry into the computer took place however, a code book was developed (Appendix B). The most difficult component of the coding manual development was the coding of the open-ended question responses. The procedure for coding these responses included: 1) recording the entire range of responses; 2) grouping together common responses or responses with common themes; 3) re-examining the groupings to see if further breakdown or grouping was possible; and 4) numbering the resulting groupings for entry into the computer. Upon entry, data files were checked for inconsistencies (errors) resulting from the data entry procedure. Errors were then corrected where possible.

Statistical techniques used to analyze and test the data were conventional ones using SPSS; Statistical Package for the Social Sciences (Nie et al. 1975). Simple

descriptive statistics (univariate analysis) for each of the individual variables, including demographic profiles, were carried out to add insight as to who bird watchers visiting Point Pelee National Park were. Bivariate analysis by way of chi-squared tests of association were carried out to find existing relationships between selected variables. Analysis of variance was then carried out to find the significance of these bivariate relationships when found.

Non-interview Methodology

The non-interview methodology utilized in this portion of the study included two separate components. The first was a participant observation component where members of the research team participated in the bird watching activity in the field and systematically recorded bird watcher activities and responses as they related to resource familiarity. The second component involved the collection of supplemental information by way of a visitor center guest book count, to find out where park visitors (birders) originated.

Resource Familiarity Participant Observations

The resource familiarity portion of the participant observation study was used to test birder knowledge and familiarization of park resources. Test species included birds, plants, insects, reptiles, and amphibians. These test species were chosen randomly as they were found in the field by the recording participant observers. The form used for the resource familiarity portion of the study is presented in Appendix C.

The sample population for this portion of the social impact study were those bird watchers within Point Pelee National Park during the spring bird migration; May 1-25, 1985.

Sampling involved the random selection of bird watchers for observation in specific portions of the park for specified periods of time during each sampling day. This procedure not only ensured an adequate and unbiased sample of bird watchers (obtaining a cross-section of birder types and activities), but ensured the sampling of activities

related to resource familiarity for different locations in the park and for different time periods each day. Each day for which resource familiarization observations were made was divided into four, two hour time periods: 8:00 to 10:00 a.m., 10:00 to 12:00 a.m., 12:00 to 2:00 p.m., and 2:00 to 4:00 p.m.. Each participant observer was assigned one of these time period and a management area for the park. Observers proceeded to the site at the designated time, found a suitable test species (i.e., wild flower, reptile, amphibian, bird, etc.), and selected the second individual birder or group of birders to pass the site, for questioning. They then asked the selected bird watcher the pertinent resource familiarity questions as per Appendix C. Upon completion, the participant observer chose the next birder to pass by as was convenient (i.e., if the test species was still on site it was used again). Data were collected from the observations regarding the following: 1) species in question; 2) answer general question correctly; and 3) answer specific question correctly. A two point scale was used for both general and specific questions, with the observer marking either a yes for correctly identified, or no: incorrectly identified.

Answering a general question correctly involved providing the general (common) name of the species under observation. Obtaining a point for the specific component of the identification required the birder being questioned to provide some reasonable follow-up to the general question with some natural history information. In the event that this information was not given to the participant observer on a voluntary basis after the initial identification, the birder being questioned was prompted for the information.

A resource familiarity rating scheme was developed so that birders' ability to identify species correctly under observation could be compared between test species. Each general question correctly answered received one point while specific questions answered correctly received two points. A weighted total score was then tabulated for each species used during the testing procedure and converted to a percentage of the total.

Data preparation and analysis procedures were very similar to those carried out for the interview questionnaire data described earlier. Observation data forms (Appendix

C) were screened for usability and a code book developed (Appendix D). Resource familiarization forms were for the most part pre-coded for ease of transfer of data onto coding sheets and direct entry into a computer data file. Variable names were then assigned to variables used in the computer programming and data analysis procedures.

Statistical analysis of the data was carried out using SPSS; Statistical Package for the Social Sciences (Nie et al. 1975). The statistical analysis process involved several different steps. Univariate analysis generated: 1) frequency distribution tables; 2) mean values; 3) medians; 4) standard deviations; 5) standard errors, and 6) minimum and maximum values. Bivariate relationships between selected user characteristics and resource familiarity were then examined. Chi-square test of association using the SPSSX sub-program, Crosstab, were carried out to determine if there was any significant association between user characteristics and the ability to answer questions correctly and between ability to answer the question correctly and the species in question. Analysis of variances was then carried out to find the significance of relationships, should any exist.

Visitor Center Guest Book Count

The visitor center guest book count was used to obtain an understanding of where bird watchers' place of residence was. Knowledge of this not only provides an indication as to the local, national, and international visitation to Point Pelee National Park, but provides a relative indication of commitment on the part of the bird watcher. A tabulation was made, by place of residence, of bird watchers signing the Visitor Center Guest Book for the period April 1 to May 14, 1985. A frequency distribution analysis was then carried out as part of the data analysis procedures.

D. Results and Discussion

The data were gathered in this portion of the bird watcher study to investigate several research questions. There were three main issues examined. The first involved an interview questionnaire which examined bird watcher socio-demographics, activity characteristics, and

selected attitude/perception variables as they pertain to the birding activity at Point Pelee National Park. The second involved a non-interview participant observation study which examined bird watcher familiarity with the natural resources at Pelee. The third component involved a visitor center guest book count in an attempt to qualify where bird watchers places of origin and level of activity commitment were.

To facilitate the discussion of the results for this portion of the study, only the most significant findings are presented and interpreted. Where appropriate, tables and figures are used to present detailed results of the data analysis.

Interview Questionnaire

The results of the interview questionnaire portion of the study are presented as they pertain to socio-demographic, activity characteristics, and perceptions/attitudes of the birding activity at Point Pelee National Park. Verbal descriptions of relationships that exist between pairs of variables under review, the significance of these relationships, and the degree of association, if any, are also presented.

Bird Watcher Characteristics

Sex

Fifty-three percent of the responding bird watchers were male and 47% were female. This proportion indicates that slightly more males participate in birding activities than females.

These results compare to Kellert (1985), who in a 1980 national study of American attitudes, knowledge, and behavior towards animals, found that committed bird watchers included 73% male (Table IV-2).

Age

The mean age of bird watchers sampled in this study area was 45.5 years. This compares closely with results from Kellert (1985) who found that the mean age for

committed birders in the United States was 42 years (Table IV-2). Nearly 77% of the respondents at Point Pelee were between the ages of 31 and 70 (Figure IV-1), while just over 56% of Canadians belong to this group (Statistics Canada 1984). This represents a significant age difference between bird watchers and the population of Canada. The median age of bird watchers at Point Pelee was 44 years.

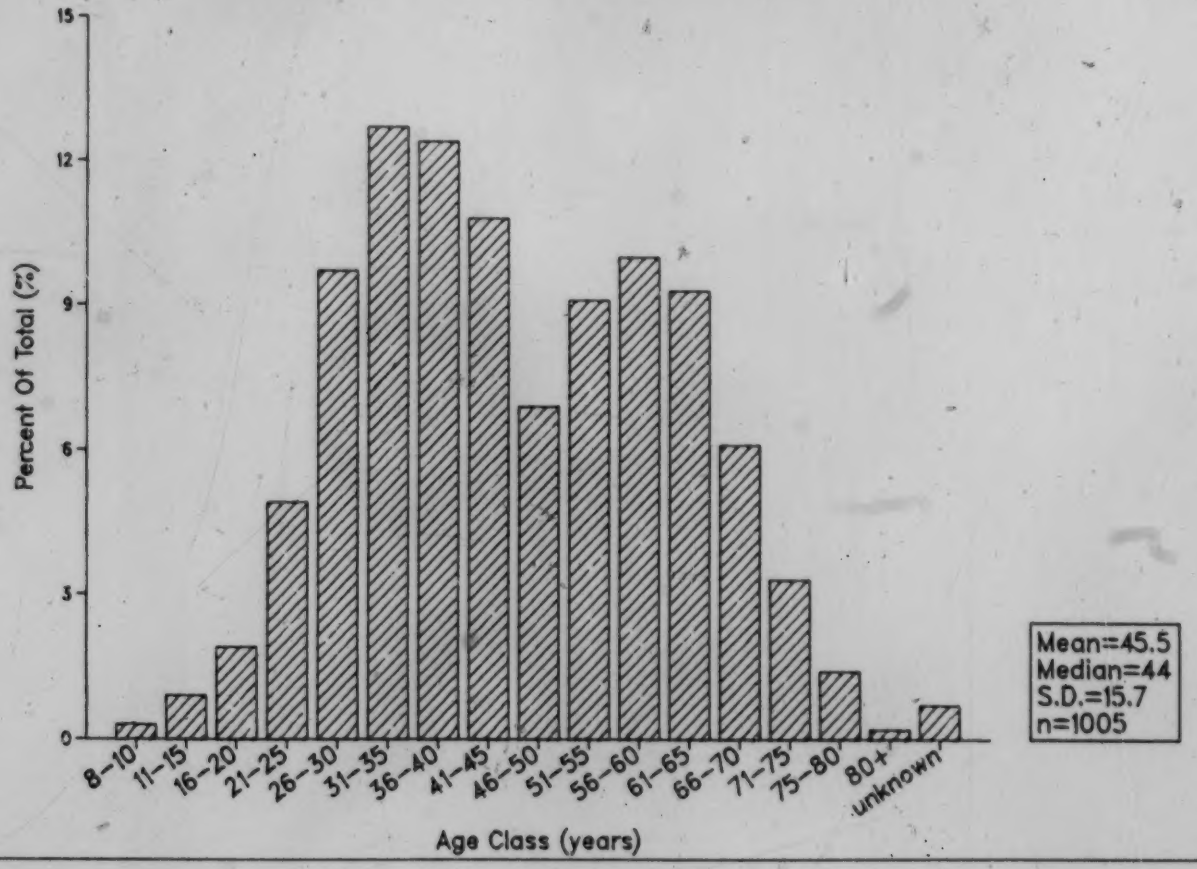
Table IV-2. Comparative Analysis of Selected Bird Watcher Characteristics From Various Related Studies.

Study	Sex (% Male/Female)	Mean Age (Years)	Education (% College or Better)
Fenton (1988)	53/47	45.5	59.4
Frost (1985)	50/50	34.0	50.0
Kellert (1985)	73/27	42.0	67.0

Several authors have suggested that the reason for the increased interest in outdoor recreation is the steadily growing amount of leisure time available to mature segments of our society (Chapman 1987; Nash 1982; Sax 1980). This same explanation can be used for the Pelee situation. Lower retirement ages and well established careers have provided birders more time than ever before to participate in quality birding activities such as those found at Pelee.

While the mean age of birders was found to be relatively high compared to that of the Canadian general public (averaging 42 years), the largest number of birders interviewed were found to be in the 21 to 40 year age class (40% of the total). This finding tends to support the theory that there is a strong emergence of a younger, active, and dedicated age group who are seen as being representative of a new wave of wildlife guardians and sophisticated political force who are becoming the leaders in the North American Conservation Movement (Butler 1984).

FIGURE IV–1. Age Of Bird Watchers Interviewed
At Point Pelee National Park – Spring, 1985



Education

From Figure IV-2 it is evident that most bird watchers have completed high school and the majority, 59.7% of the birders, held bachelor degrees or greater. Only 7.1% of the general public of Canada and 14% in the United States hold the minimum of a bachelors degree (Statistics Canada 1984; NORC 1981). In addition, 14.1% of Pelee bird watchers held masters degrees and 16.0% of those interviewed held doctorate degrees. No other recreational user group, to the best of this writer's knowledge, represents a higher profile of educational attainment.

Studies by Kellert (1985) and Frost (1985) found comparable educational attainment results for birders being studied with 59% and 50%, respectively, having the equivalent of a bachelors degree or greater (Table IV-2).

These findings are important from a management standpoint. As levels of educational attainment increase the requirement for explanations as to the implementation of management strategies also increases as people in higher education classes tend to be more highly independent and assess a situation before conforming or complying to the strategy or role (Butler 1980). In addition, quality information and presentation are important if the park visitor is to take notice of and accept management strategies.

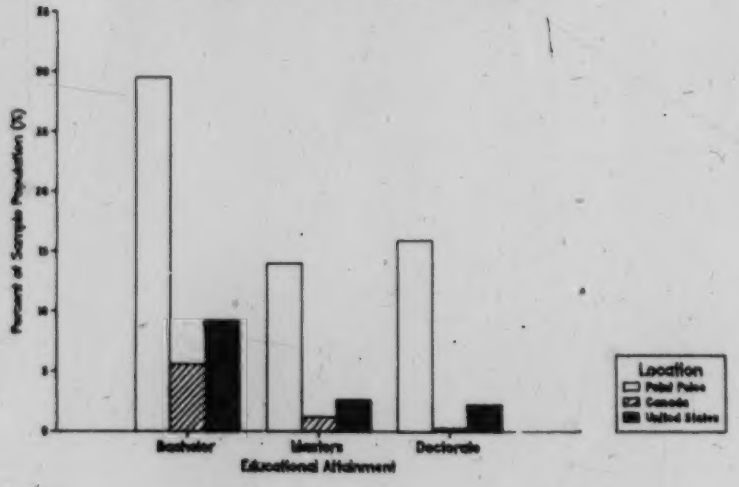
Residence

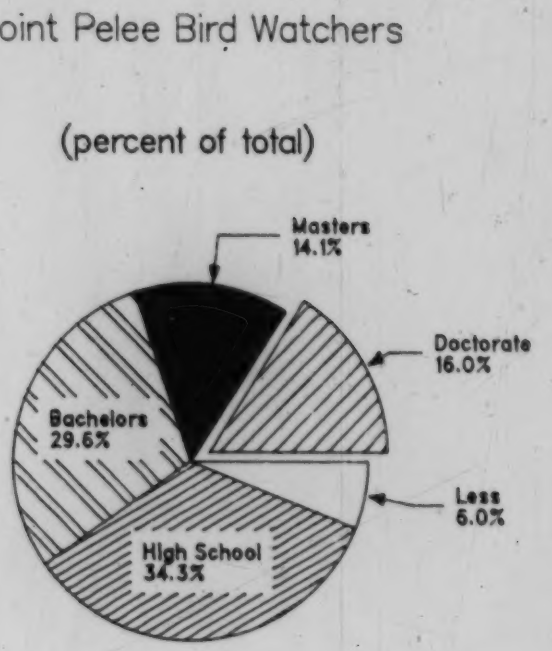
When asked for residential background, 69.4% of bird watchers interviewed said that they came from urban areas. Only 27.1% said they came from primarily rural area. Since Point Pelee National Park is only 80 kilometers southwest of the large urban center of Windsor-Detroit, it was not surprising to find these proportions.

Occupation

Figure IV-3 shows that a majority, 59.9% of the bird watchers interviewed, classified themselves as professionals or managers, although a wide variety of occupations

Figure IV–2. Educational Attainment of Bird Watchers Visiting Point Pelee National Park – Spring, 1985





were represented. Just over 13 percent of the respondents were retired and 6.2% were students.

A recent article on bird watching (Chapman 1987) reaffirms these findings by stating that people who are actively participating in birding activities are increasingly found to be middle-aged (both men and women) having executive management occupations.

Group Size

Table IV-3 shows that the average group size for bird watching parties was 3.67 persons. Nearly one half, 44% of the park users, were birding in pairs. Only 6% of the groups were composed of eleven or more people.

Group Type

The bird watcher group types are shown in Table IV-4. As indicated, the majority of visitors to Point Pelee comprised of family groups (39%) and groups of friends (37%). Just over 13% of birders came to Pelee alone and another 8.2% came as members of an organized group.

Photographers

Bird photographers were classified into three distinct categories on the basis of equipment in possession at the time of interview. Just over 29% of birders interviewed were photographers (Figure IV-4). Of these, 24.2% were snapshot photographers, 53.9% were classified as general bird photographers (described as having a 35 mm camera with a lens adequate for bird photography), and 6.9% were advanced photographers (being described as having multiple cameras, long lenses, and recognizable experience). This breakdown by photographer type is also provided in Figure IV-4.

FIGURE IV–3. Occupation of Bird Watchers Interviewed At Point Pelee National Park – Spring, 1985

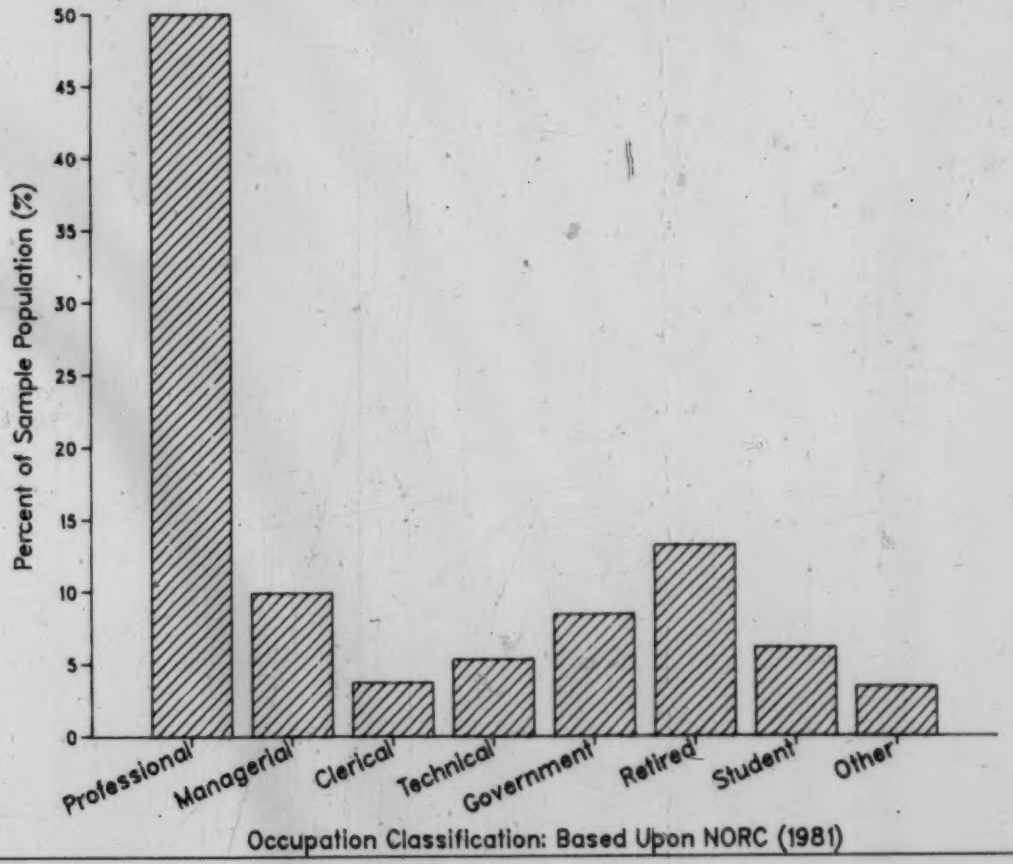


Table IV-3. Group Sizes of Bird Watchers Interviewed at Point Pelee National Park - Spring, 1985.

Average Group Size[1]	Percent of Visiting Birders in Each Group Size Category[2]					
	1	2	3-4	5-10	11-20	20+
3.67±11	13.4	43.3	27.2	10.0	4.0	2.1

[1]Confidence Interval, $p<.05$
[2]n = 1005

Table IV-4. Summary of Bird Watcher Group Types Visiting Point Pelee National Park - Spring, 1985.

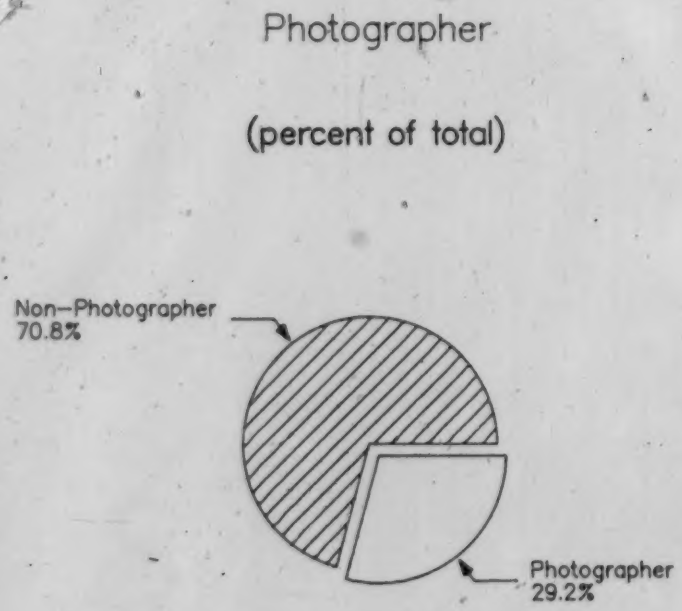
Type of Group	Frequency	Percent of Total
Individuals	122	12.1
Couples	32	3.2
Family	392	39.0
Group of Friends	373	37.1
Organized Group	82	8.2
Unknown	4	0.4
Total	1005	100.0

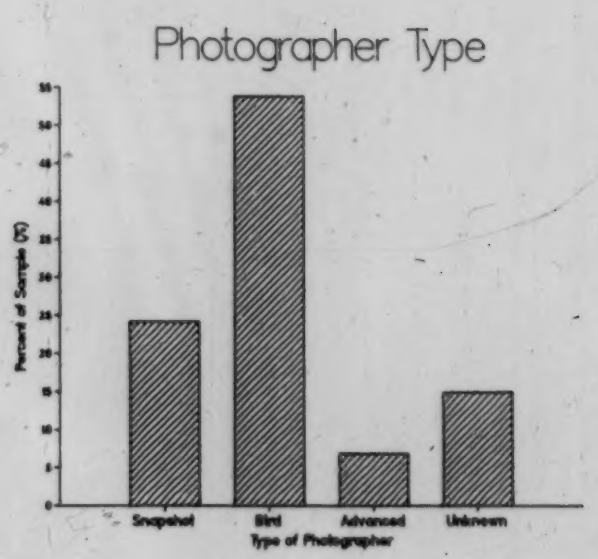
Table IV-5. Average Number of Photographs Taken Each Day at Point Pelee National Park by Photographers - Spring, 1985.

Photographer Type	Sample Size (n)	Average Number of Pictures[1]
Snapshot	71	22±3.2
Bird	158	55±10.3
Advanced	20	161±105.5
Total	249	

[1]Confidence Interval; $p<.05$

FIGURE IV–4. Photographic Activities Of Bird Watchers Interviewed At Point Pelee National Park – Spring, 1985





For all photographer types, the average number of pictures taken per person each day is 55. If this average is converted to a total number of pictures taken by all photographers visiting Point Pelee for the month of May alone, some 1.7 million photographs were taken involving a total economic expenditure of $710,000 for film and development alone.

The number of pictures taken each day varied by photographer type. Table IV-5 provides a frequency distribution of the average number of pictures taken by photographer type. Snapshot photographers took an average of 22 pictures per day, bird photographers took 55 photographs each day, and advanced photographers took an average of 161 pictures each day.

Conservation Organization Affiliation

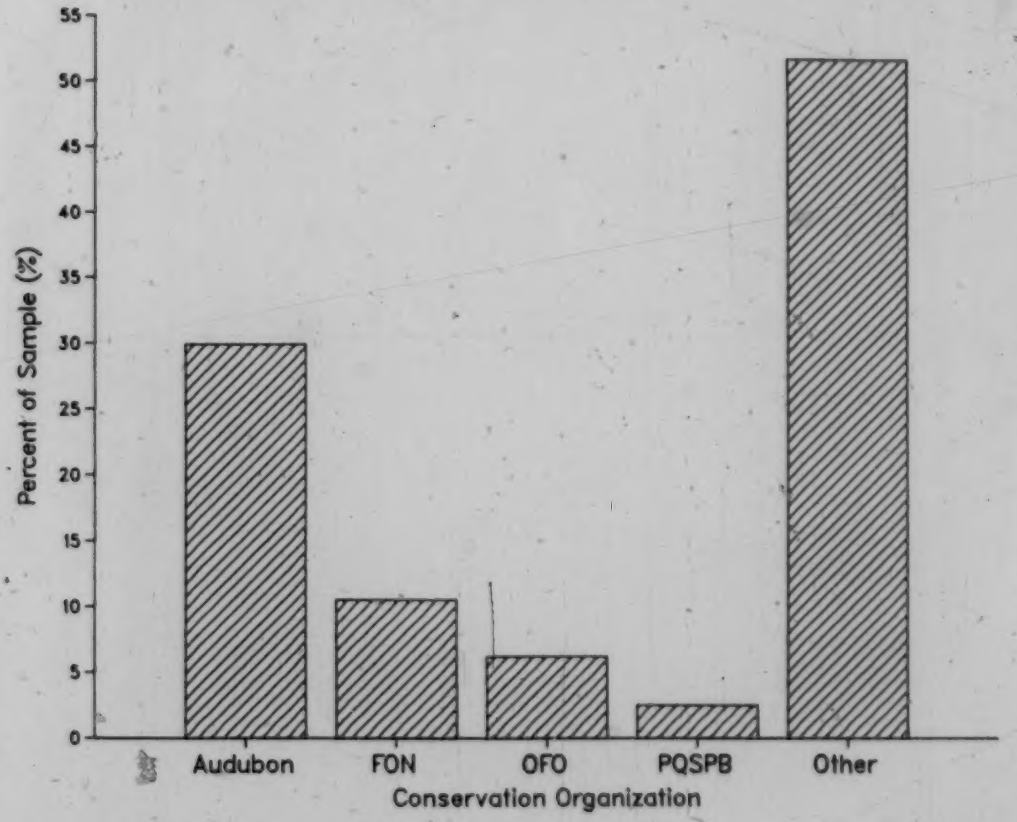
In general, bird watchers visiting Point Pelee were affiliated with at least one conservation oriented organization. Nearly sixty percent (59.7%) of respondents said that they belonged to at least one organization. In some cases birders were affiliated with as many as seven organizations, with the average number of affiliations being 1.5.

Figure IV-5 indicates the conservation organizations to which bird watchers were most often affiliated. Just over 29% of those interviewed were affiliated with the National Audubon Society, 10.3% were affiliated with the Federation of Ontario Naturalists (FON), 6.1% with the Ontario Field Ornithologists (OFO), 2.5% with the Quebec Society for the Protection of Birds (QSPB), and 51.8% with one of a host of other organizations. A complete list of conservation oriented organizations mentioned during the interview period is presented in Appendix E.

Length of Visit to Point Pelee

Table IV-6 provides a frequency distribution of the length of time, in days, that bird watchers spent at Point Pelee during their visit. A majority of birders (70.8%) spent

Figure IV–5. Summary of Conservation Organization Affiliations By Bird Watchers Visiting Point Pelee National Park – Spring, 1985



one to four days in the area. The average length of stay in the Point Pelee area was 4.6 days. This length of stay however, ranged from one to thirty days.

Length of Birding Activities

Birding at Pelee during the spring migration is a highly intensified activity with each bird watcher spending from 1 to 22 hours in the pursuit of birds. Table IV-7 provides a frequency distribution of the length of time, in hours, that birding activities lasted each day. The average birding day lasted 9.8 hours of which time is frequently spent in the park and in the surrounding area, often beginning before first light and continuing until after dark in the evening. Just over 42 percent of bird watchers spent between 9 and 12 hours in the park each day.

These findings tend to suggest that Pelee is a destination point with people travelling to the park and surrounding areas for the specific purpose of watching birds. The high intensity also suggests that there is much associated anticipation for the activity.

Previous Birding Experience

Bird watchers visiting Point Pelee during the spring migration have considerable past birding experience, with 78% of those interviewed stating they had been actively birding for five years or more. Figure IV-6 indicates the level of experience by birders interviewed at Point Pelee. The average amount of previous experience among Pelee bird watchers was 14 years. Only 3.3% of those people interviewed were birding for the first time.

Previous Birding Visits

Most bird watchers at Point Pelee National Park were repeat visitors with 80% of those interviewed saying they had been to the park at least once in the past. Nearly 55% of birders interviewed had been to the park 1 to 9 times in the past for the purpose of

Table IV-6. Length of Visit to Point Pelee National Park by Bird Watchers - Spring, 1985.

Average Visit Length[1] (days)	Number of Days (% of Total)[2]					
	1-2	3-4	5-6	7-8	9-12	13-20
4.6±0.31	32.8	38.0	12.5	6.5	4.6	5.6

[1]Confidence Interval, $p<.05$
[2]n = 1005

Table IV-7. Length of Birding Activity at Point Pelee National Park - Spring, 1985.

Average Time Birding[1] (hours)	Hours Each Day (% of Total)[2]					
	1-4	5-8	9-12	13-16	17-22	Unknown
9.8±0.2	5.0	34.3	42.1	17.1	0.4	1.1

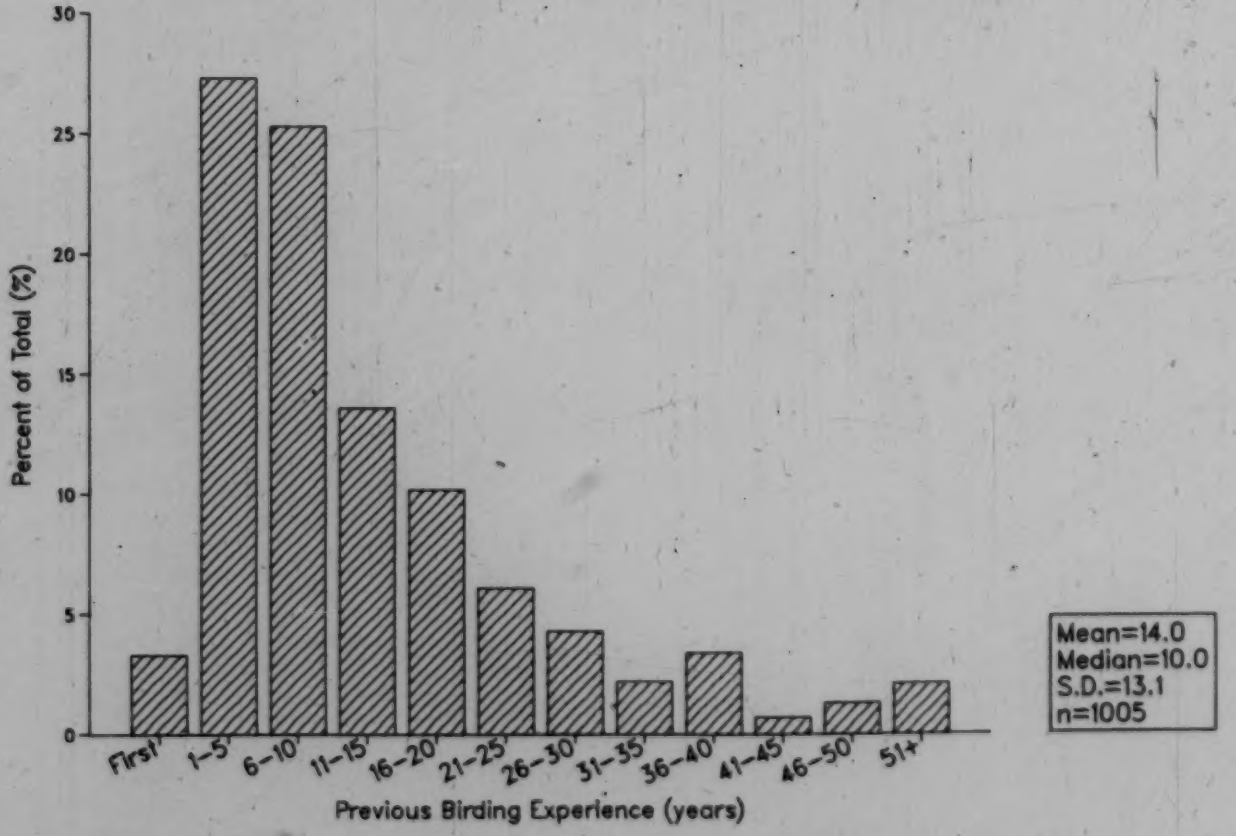
[1]Confidence Interval, $p<.05$
[2]n = 1005

Table IV-8. Number of Previous Visits to Point Pelee National Park by Bird Watchers - Spring, 1985.

Number of Previous Visits	Frequency	Percent of Total
None	198	19.7
1-4	376	37.4
5-9	174	17.3
10-14	89	8.9
15-19	38	3.8
20 +	127	12.6
Unknown	3	0.3
Total	1005	100.0

Mean = 11.9
Median = 4
S.D. = 22.7

FIGURE IV–6. Previous Birding Experience Of Bird Watchers Interviewed At Point Pelee National Park – Spring, 1985



bird watching. The average number of previous visits was 12. Only 19.7% of those interviewed were first-time visitors. Table IV-8 provides a frequency distribution of previous visits to the park by bird watchers.

The large number of repeat visitors to Point Pelee is reflective of the exceptional viewing opportunities available. As a result of these viewing opportunities, birders are not satisfied with lesser experiences offered elsewhere and so return to Pelee year after year.

The high degree of repeat visitation is also reflective of the social element of the birding experience. The Pelee visit provides birders with the opportunity of not only obtaining a quality experience, but of re-uniting with friends and colleagues with similar interests, friends and colleagues not seen since the previous year.

Visitor Center

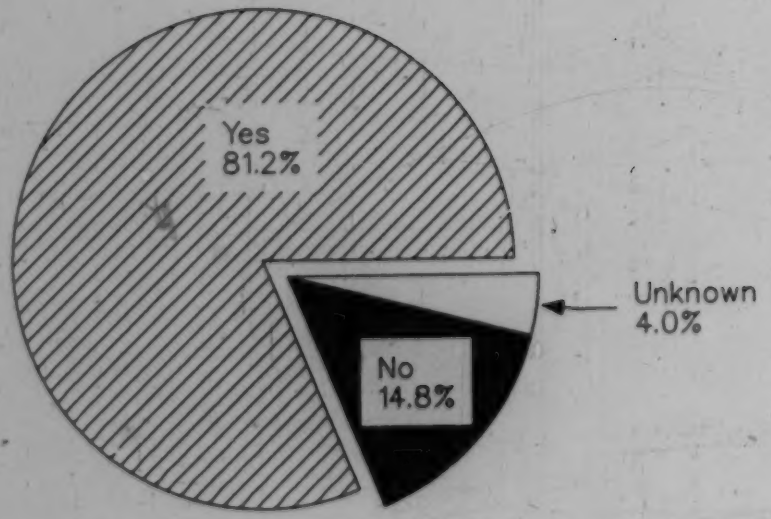
When bird watchers were asked if they had been to the visitor center, 81.2% said that they had been through at least once (Figure IV-7). Bird watchers used the visitor center as a major source of information regarding rare bird sightings and the location of these sightings within the park. Birders returned to the visitor center two and three times each day just to find out if any new or rare bird species had been seen or listed.

Open-ended Questions

During the interview questionnaire process birders were asked to respond freely, in an unstructured format, to four questions dealing with personal perceptions and opinions. The responses to each of these questions is presented and discussed in the following.

FIGURE IV–7. Trips to Visitor Center Each Day By Bird Watchers At Point Pelee National Park – Spring, 1985

(percent of sample)



Birding at Point Pelee: Likes

When asked what it was that they liked most about bird watching at Point Pelee National Park, birders gave a great variety of responses, with 51 different ones being categorized. The number of individual responses varied from one to eleven, with the average number of responses being 3. Only nine people could not provide a response to this question.

Figure IV-8 shows that nearly 62 percent of bird watchers interviewed said that they liked the birds (i.e., variety and number of bird species). Eleven percent said that they liked the park environment (i.e., clean, fresh air, variety of habitats). A further 8 percent of respondents said that they liked the facilities that were available for use (i.e., trails, nature center, train). A complete list of birder responses is provided in Appendix F.

Birding at Pelee: Dislikes

When asked what it was that they liked least about birding at Pelee a total of 40 different birder responses were categorized. The number of responses provided by individual birders varied from one to six, with the average being 1. Forty-two percent of those interviewed (n=1005) did not provide a response to this question.

Figure IV-8 indicates that slightly more than 50% made negative reference to other visitors of the park (i.e., crowds, noisy, novice birders, other user groups). A further 18.5 percent had concerns of a facility or operational nature (i.e., campground booking problems, quality of concession food, etc.). Appendix G provides a complete list of birder responses.

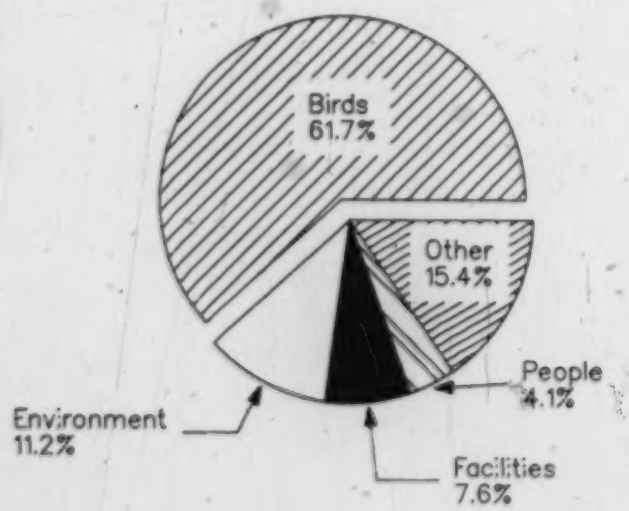
Impressions of Other Birders: Likes

When asked what it was that they liked about other bird watchers at Point Pelee, the variation in responses was great. Twenty-eight different responses were categorized

FIGURE IV–8. Summary Of Responses About Birding At Point Pelee National Park – Spring, 1985

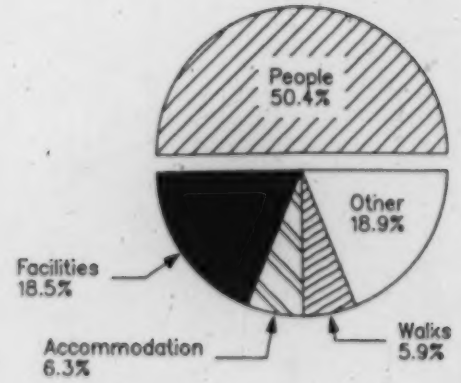
Likes

(percent of total)



Dislikes

(percent of total)



with the number of individual responses per birder ranging from one to seven, with an average of 2. Of those interviewed, only 55 people could not provide a response to this question.

Figure IV-9 indicates that the most common responses were that other birders shared birding information and/or sightings (36.9% of the total), followed by the related response that other birders were friendly (33.6% of the total). Nearly ten percent responded that other birders' birding ethics were sound (e.g., good conduct around birds, did not litter, and respect for other birders). A complete list of responses is presented in Appendix H.

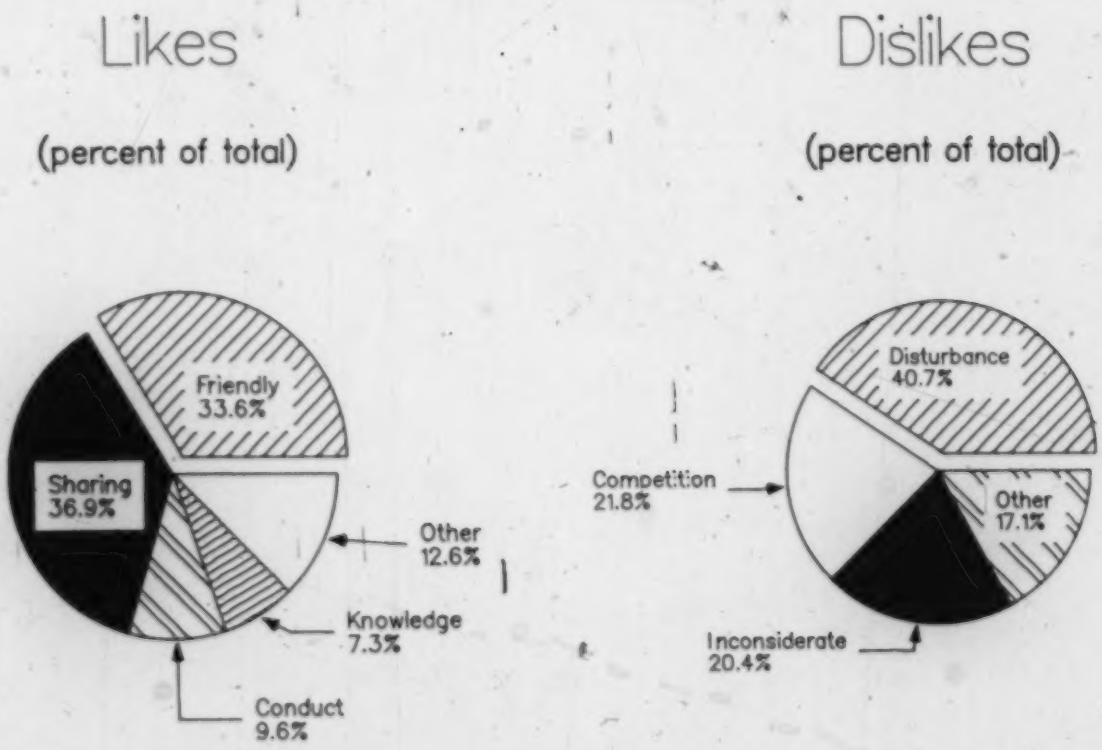
Impressions of Other Birders: Dislikes

When asked what bird watchers disliked about other birders at Point Pelee 21 different responses were categorized. Only 34 percent of the sample (n=1005) provided responses. Forty-one percent of respondents were concerned that some birders caused environmental disturbances (e.g., flushing birds, off trail use, picking flowers, disturbing nests, and playing tapes or calls). Nearly 22% said that some birders were too competitive (e.g., listing, aggressive behavior). A further 20.4% said that some birders were inconsiderate (e.g., noisy and/or anti-social). Figure IV-9 provides a graphic summary of these responses. A frequency distribution of all birder responses is provided in Appendix I.

Resource Familiarization

The resource familiarization portion of the unobtrusive participant observation study was designed to test bird watcher knowledge and familiarity with the park resources. Test species included birds, plants, insects, reptiles, and amphibians. Results for this portion of the observation study deal with those variables related to visitors' familiarization and knowledge of these resources. These variables included species in question, general name, specific name,

FIGURE IV–9. Summary Of Responses About Other Birders At Point Pelee National Park – Spring, 1985



and an overall rating scheme for familiarity level comparisons between species. Each of these is presented on an individual basis, followed by a discussion of any relationships that may exist.

Species in Question

Table IV-9 provides a frequency distribution of the species that were used as test species during this portion of the study at Point Pelee National Park. The most common test species chosen were reptiles (snakes and turtles) comprising 29.8%, followed by plants (25.6%), and amphibians (20%). Nearly 20% of species chosen in the field for test purposes were birds.

Ability to Answer General and Specific Questions

When selected participants (n=168) were asked for the general (common) name of the species under observation, birders could provide it 56.5% of the time (Figure IV-10), but could only provide a reasonable follow-up of some natural history information (or specific name) 29.2% of the time. It is surprising how little is known about park flora and fauna beyond its common name.

The ability to answer the general question was found to differ by sex with males answering the questions correctly 68.2% of the time, as compared to only 36.1% for females. Table IV-10 portrays this relationship. The ability to answer the specific question correctly was also found to differ on the basis of sex of the bird watcher being questioned. When examining this relationship (Table IV-11) it can be seen that male birders provided some reasonable follow-up to the general question 35.5% of the time compared to only 18.1% of the time for females.

The ability to answer the general question was also found to differ with the age of the male birder being questioned. The younger the male visitor to Pelee, the more likely he was of answering the general questions correctly (Table IV-12). Such a relationship was not as evident for females. The higher knowledge rating of young male

Table IV-9. Test Species Used in Resource Familiarity Quiz at Point Pelee National Park - Spring, 1985.

Species	Frequency	Percent of Total
Birds	33	19.6
Reptiles	50	29.8
Amphibians	33	19.6
Plants	43	25.6
Other[1]	10	5.4
Total	168	100.0

[1](fish/mammals/insects)

FIGURE IV–10. Ability Of Birders At Point Pelee National Park To Identify Flora And Fauna Resources – Spring, 1985

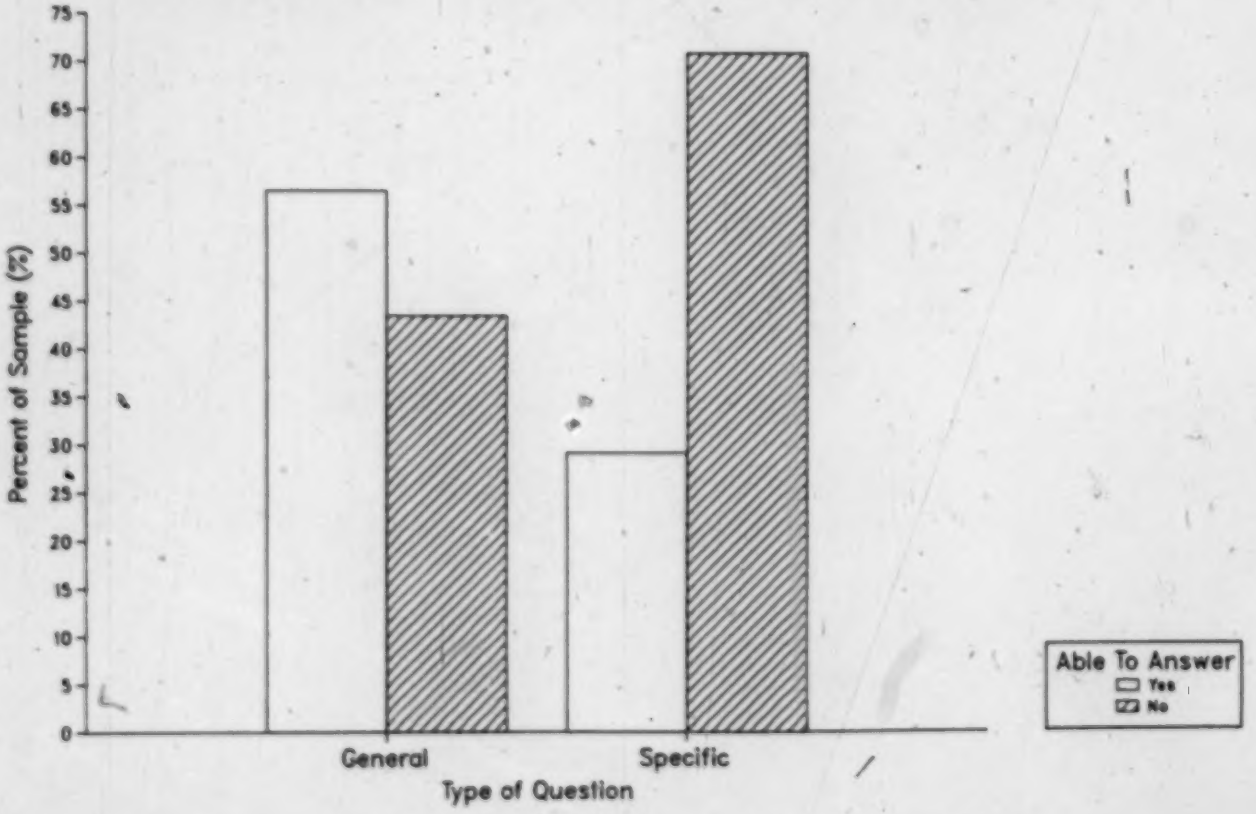


Table IV-10. Ability of Birders Visiting Point Pelee National Park to Answer General Resource Familiarity Questions - Spring, 1985.

Answer General Question	Sex		Total (n)
	Male	Female	
Yes	68.2	36.1	(95)
No	31.8	63.9	(73)
Total (n)	100 (107)	100 (61)	(168)

$X^2 = 15.07$, d.f. = 1; $p<.01$

Table IV-11. Ability of Birders Visiting Point Pelee National Park to Answer Specific Resource Familiarity Questions - Spring, 1985.

Answer Specific Question	Sex		Total (n)
	Male	Female	
Yes	35.5	18.1	(49)
No	64.5	81.9	(119)
Total (n)	100 (107)	100 (61)	(168)

$X^2 = 4.93$, d.f. = 1; $p<.03$

Table IV-12. Variation in Ability to Answer General Resource Familiarity Question By Male Birders and Age of Birder Visiting Point Pelee National Park - Spring, 1985.

Answer General Question Correctly	Age Class (Years)							Total (n)
	<11	11-20	21-30	31-40	41-50	51-60	61 +	
Yes	100	100	66.7	83.3	75	64.3	38.1	(73)
No	0	0	33.3	16.7	25	15.7	61.9	(34)
Total (n)	100 (1)	100 (3)	100 (12)	100 (24)	100 (32)	100 (14)	100 (21)	(107)

$X^2 = 13.98$, d.f. = 6; $p<.03$

birders over older male birders is supported by general observations made in recent years by the Park Staff (D. Wilkes pers comm.1986)[1] and is reflective of expanded enthusiasm in young people for bird watching.

Resource Familiarity Rating Scores

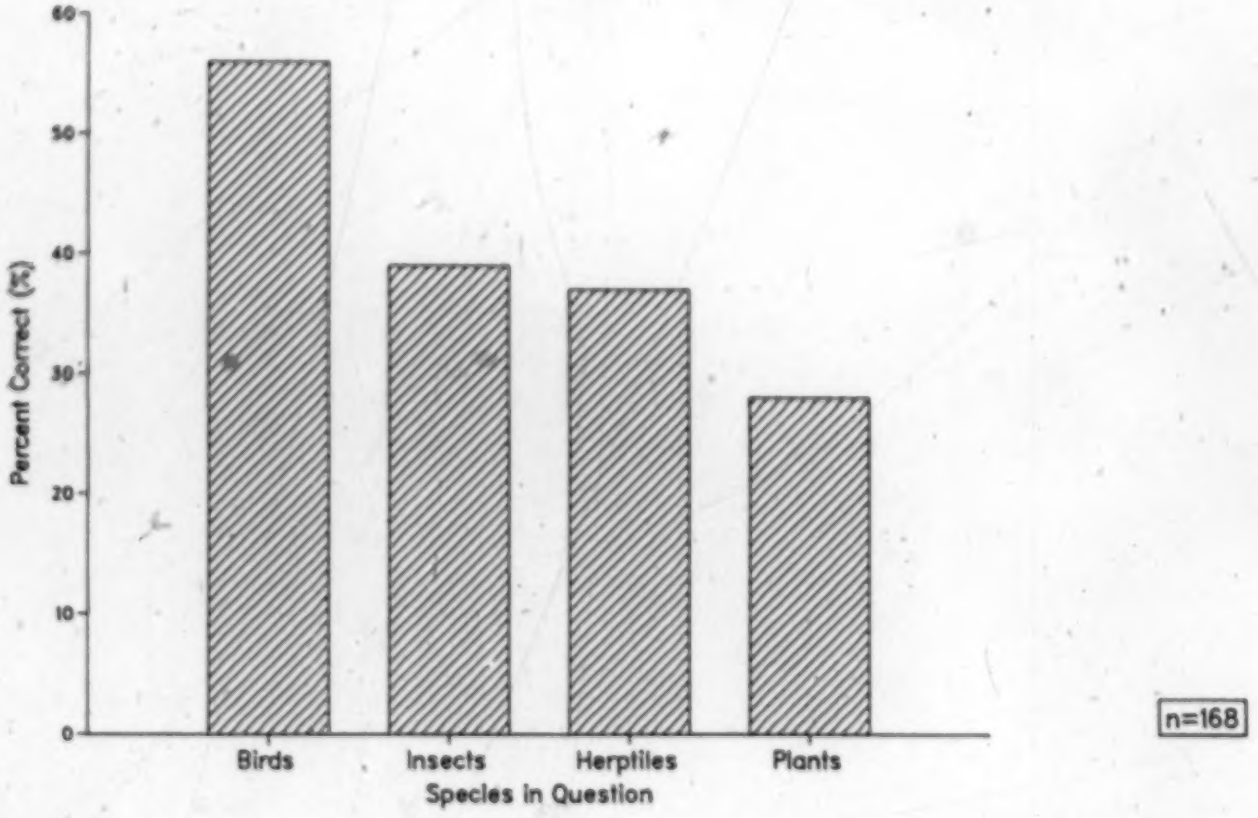
As would be expected, visitors knew the birds best; they correctly identified 56% of the birds during the field quiz (Figure IV-11). Insects (most commonly butterflies) were known next best, with respondents overall obtaining a score of 39%, followed by reptile and amphibian species with a score of 37% correct. Visitors were least familiar with plants (most commonly wildflowers), scoring only 28% during the field quiz. The low interest in and unfamiliarity with plant species by birders in general may well be a contributing factor to the high levels of impact on the plant community as a whole.

In terms of general identification of natural resources at Pelee, the familiarity that bird watchers visiting the park had was quite good. Results may be explained by one of two factors. The first has to do with the breadth of the interpretive programming at Point Pelee National Park and is to the credit of the interpretive staff involved. The second has to do with the excellent field guides available to the general public. There appears to be a greater range of field guides available for eastern species than are usually available elsewhere.

It is surprising however, that more is not known past the general identification of species. This may be a result of a number of factors. The first involves the tendency of people to focus upon name basis identification only. A majority of people are either not interested enough in or committed enough to learn more about the individual species under review. Another possible explanation for this finding is that park interpreters are focusing upon identification only during their programs. As expansion of the current programs to include life history information of species found in the park (not just birds)

[1]Personal communication. D. Wilkes. Assistant Chief Park Interpreter, Point Pelee National Park, Ontario. April, 1986.

FIGURE IV–11. Familiarity Level Rating Scores For Bird Watchers Visiting Point Pelee National Park – Spring, 1985



may increase the knowledge of and appreciation for plant and wildlife resource found at Pelee.

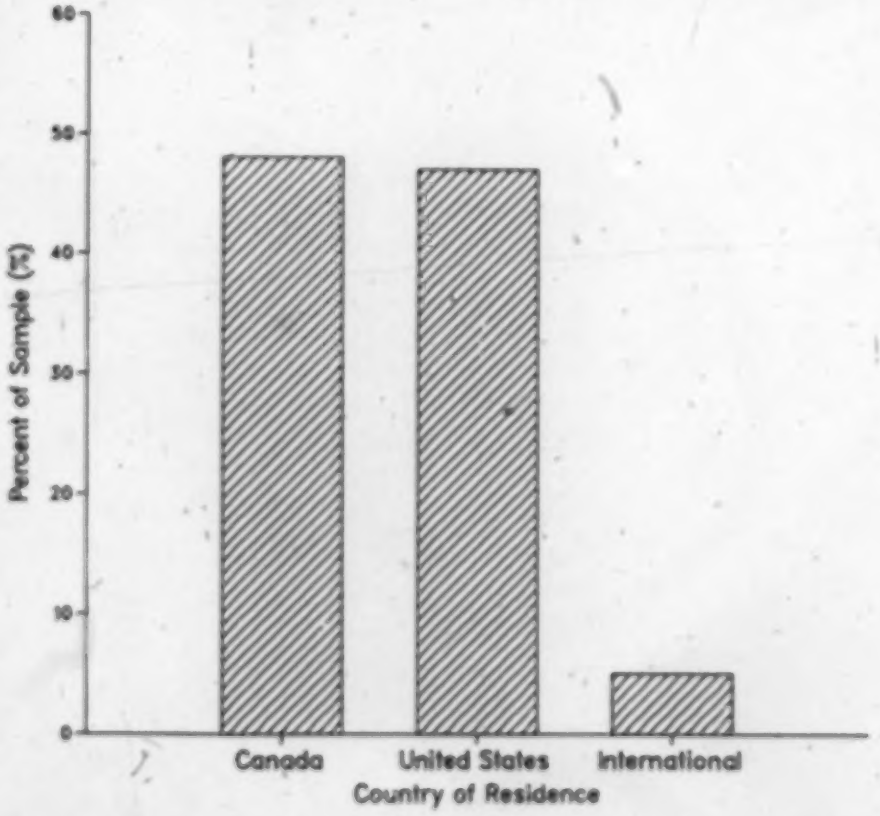
It is understandable that bird watchers at Pelee know the birding resource the best as this is the resource which has drawn the visitors. A possible explanation for the fact that birders knew reptile/amphibian resources better than plant resources may be that there are so many rare reptiles/amphibians found within the park.

Visitor Center Guest Book Count

Results from the Visitor Center guest book count suggest that while the largest group of park visitors are from Canada (48%), a majority are from other countries. Figure IV-12 indicates that 47 percent of Pelee visitors are from the United States, especially Michigan, Ohio, and Illinois. A further 5% are international visitors, especially Belgium, Holland, and the United Kingdom. This visitation from areas other than Canada suggest once again that the experience offered at Pelee must be a premier one as visitors are travelling great distances to participate in birding activities at Pelee.

The results obtained through this technique may be somewhat biased and not represent the true visitation to the park. A recent study carried out by Environment Canada - Parks (1986) which interviewed park visitors as they left the park (n=515), suggest that during the month of May visitation from Canada comprised 46.1 percent of the total. Visitation from the United States comprised 32.9 percent of the total and International visitation only 0.4 percent of the total. This study however, could not account for 20.4% of the visitor population sampled over the study period (resulting from non response). This unknown may contain the additional 4.5% of international visitation found during the Visitor Center guest book count.

FIGURE IV–12. Residence of Bird Watchers Interviewed At Point Pelee National Park – Spring, 1985



E. Management Implications

This portion of the Bird Watcher study at Point Pelee National Park has been carried out in an attempt to identify this unique and previously poorly understood recreation user group. Only through a better understanding of who bird watchers are and how they spend their time during their recreational pursuits can parks and recreation managers hope to make effective management decisions. The demographic and activity information provided in this portion of the bird watcher visitor study, when used in combination with other site specific impact information (i.e., ecological and social), will help in making these management decisions.

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V. Paper II: Social Impacts of Bird Watchers at Point Pelee National Park

A. Introduction

Bird watching is probably the fastest growing wildlife-related recreation activity in North America (Butler 1984; Harrison 1976; Scofield 1978). Participation in Canada and the United States has increased from combined estimates of eight million in 1965 to participation currently of twenty million people each year (Kellert 1985; Filion et al. 1983; Lyons 1982; U.S. Bureau of Outdoor Recreation 1967).

Bird watching as a recreation activity at Point Pelee National Park has been growing steadily in popularity since the turn of the century when noted ornithologists P.A. Taverner, W. Brodie, and W.E. Saunders drew the attention of the Great Lakes Ornithological Club to the Point Pelee spring migration. Since the park is located on both the Atlantic and Mississippi Flyways, and the apex of the southern Ontario Peninsula, birds are funnelled through Pelee. This migration phenomenon occurs in both the spring and the fall. It is the spring migration however, with its greater concentrations and colorful wood warblers that draw the largest crowds of people.

Point Pelee National Park has become one of the most famous locations in the world for watching the migration of birds during the spring months of April and May (Harrison 1976). Presently some 60,000 to 80,000 gate visits of bird watchers are recorded during the spring passerine migration each year involving more than 20,000 individual visitors. On a busy day during the peak of the migration 6,000 people can be found within the confines of the park's 6.2 square kilometer landbase. Of these, 70% (4,200 individuals) can be found at any one time in the Tip Area (an area of only 1.5 square kilometers at the end of the peninsula). This number of bird watchers in such a small area has caused some concern for impacts on park visitor satisfactions and the quality of the birding experience.

The social carrying capacity concept is but one of the latest innovations which has the potential for use at Point Pelee. It is of prime concern in today's analysis of management tools, particularly in the overall framework of recreation planning and management. There

are, however, several problems associated with the implementation of a social capacity. First, although resource managers of national parks are implicitly concerned with the social factors involved with providing particular kinds of recreation experiences, they are often uncomfortable with limiting use on this basis. Instead, managers overemphasize biological capacity (Hendee and Stankey 1973), and set use limits on the basis of ecosystem impacts which are demonstrable, but often trivial from the point of view of the park visitor. Secondly, and most importantly from the viewpoint of park managers, what is a quality recreation experience? Relatively little is known about the nature of the social interactions that occur among bird watchers at Point Pelee. It has been pointed out, however, that national parks are an important, complex, and dynamic setting for human behavior (Sax 1980; Machlis et al. 1981) and that social impacts are inevitable in popular recreation settings because of differences in visitor attitudes, expectations, and experiences (Hendee and Catton 1968; Ditton et al. 1983; Gramann 1982), but what is an acceptable amount of birder interaction and what are the factors which affect the birding experience? It is possible that certain types or groups of bird watchers are affected by social interaction more than others, but again, who these people are and how many interactions there are is not known.

Several studies have suggested that the recreation experience is often enhanced through social interaction, especially when the interaction occurs with people of like interests and expectations (Clark and Stankey 1979, Lee 1977, Machlis et al. 1981). Other studies, however, have suggested that an increase in the density of visitors causes increased interaction among individuals or groups and that people feel more crowded as interaction rates increase (Gramann 1982, Heberlein and Vaske 1977).

The purpose of this portion of the research was to obtain a better understanding of the social impacts that Pelee's trend toward increased popularity and expanding visitor numbers is having on the bird watcher population visiting the park.

B. Study Area Location and Description

Point Pelee National Park is a day-use park located in the southern part of Essex County in southern Ontario, 80 kilometers southwest of the large urban center of Windsor-Detroit (Figure I-1). The national park is a 15 kilometer sandspit formation extending into the western basin of Lake Erie. With a total area of only 16 square kilometers, 29% of which are drylands and 71% freshwater marsh, Point Pelee is one of the smallest parks in the Canadian Park System. A more detailed description of Point Pelee National Park is provided in Part I.

C. Methodology

Two separate study methodologies were utilized during this portion of the study: a personal interview questionnaire component and a social interaction participant observation component.

Interview Questionnaire

The interview questionnaire portion of the social impact study was used to obtain information on bird watcher attitudes and perceptions as they related to feelings of crowding at Point Pelee National Park. Questionnaire design, sampling techniques, and data preparation and analysis were described at length in Part I. Question 6 of the Personal Interview Questionnaire Form (Appendix A) was used to obtain attitudinal data relating to perceptions of crowding. The construction of this question provided for those who had strong opinions or attitudes to express themselves by choosing a polarized category such as **'too many'** and **'too few'**. It also provided a category for those who were satisfied with the situation, in a response of **'just right'** or for those who were extremely dissatisfied with the number of people in the park that day in a response of **'far too many'**.

One additional crowding related variable became evident during the open-ended question process (question 5, Appendix A) and is discussed in the following results.

Visitor Interaction Participant Observation

The visitor interaction portion of the participant observation study was directed at obtaining a better understanding of social interactions among bird watchers during their activities in the park.

Unobtrusive participant observation is a combination of research techniques, including sharing in the daily lives of those being studied, for the systematic description of behavior in social settings (McGaw and Watson 1976). This methodology was used at Point Pelee because it allowed for observation of birding activities as they occurred in the social setting, activities that would otherwise be very difficult to quantify under more formal and standardized methodologies such as the interview format.

The sample for this portion of the social impact study were those bird watchers actively birding within Point Pelee National Park during the spring bird migration: May 1-25, 1985.

Sampling involved the random selection of bird watchers for observation in specific portions of the park for specified periods of time during each sampling day. This procedure not only ensured an adequate and unbiased sample of bird watchers, obtaining a cross-section of birder types and activities, but ensured the sampling of activities related to social interaction for different locations in the park and for different time periods each day.

Each day for which visitor interaction participant observations were made was divided into four two-hour time period: 8:00 to 10:00 a.m., 10:00 to 12:00 a.m., 12:00 to 2:00 p.m., and 2:00 to 4:00 p.m. Each participant observer was assigned one of these time period and a management area for the park. Observers proceeded to the site at the designated time and selected the second individual birder or group of birders who entered the site, for observation. They then followed that individual or group and recorded social interactions that these individuals or groups had with other individuals or groups while within the sampling area. Types of interactions, lengths of interaction, and responses to those interactions were recorded on the Visitor Interaction Participant Observation Form (Appendix K). As the group or individual left the sampling area, the participant observer repeated the process with the

next birder(s) that entered into the area. This procedure continued until the sampling period expired.

Data preparation and analysis procedures were very similar to those carried out for the interview questionnaire portion of the study in Part IV. Participant observation data was pre-coded on the observation forms, a code book was developed (Appendix L), observation data were transferred onto coding sheets, and entered into a computer data file. Analysis of data was carried out using SPSS: Statistical Package for the Social Sciences (Nie et al. 1975). Frequency distributions and summary statistics were generated for each individual variable. Bivariate analysis was carried out between socio-demographic and activity characteristics of bird watchers and the social impact variables using Chi-square test of independence. Testing the difference between means of specific variables utilizing ANOVA (one-way analysis of variance) was then carried out.

D. Results and Discussion

The following section presents the results as they pertain to the social impact section of the bird watcher study carried out at Point Pelee National Park during the spring bird migration of 1985. Results and relationships are presented and then discussed in a management context so as to add insight into the possible explanations for the existing relationships.

Interview Questionnaire

Perceptions of Crowding and Dissatisfaction

During the interview questionnaire design two questions were developed in an attempt to obtain a better understanding of bird watchers' perceptions of crowding (Question 6; Appendix A). The first asked birders (N=1005) to respond to the number of people present in the park that day in accordance to a modified Likert scale. Figure V-1 shows that with response categories preset, 56% stated that the number of people

present in the park that day was just right, 34% reported that there were too many, and just under 6% stated that there were far too many. The second question asked bird watchers (n=371) whether the number of people present in the park that day detracted from their enjoyment of the park and its resources. Sixty percent responded no, while 40% said yes, the number of people present did detract from their enjoyment (Figure V-1).

As would be expected, these two variables are closely related, with 26.2% of the variability in feelings that people have about the numbers of others being explained by whether or not the number of other birders detracted form their enjoyment of the park and its resources. Table V-1 provides a tabular summary of this relationship.

It is interesting to note that while 50.4% of the total birder sample (n=345) said that there were too many or far too many people in the park, nearly 33% of these said that the numbers did not detract from their enjoyment.

During the open-ended question response portion of the interview questionnaire, an additional crowding-related variable became evident and helps to add insight to the social impact question. When asked what they liked least about birding at Point Pelee National Park, 34% of the sample (n=1005) reported that they felt it was crowded.

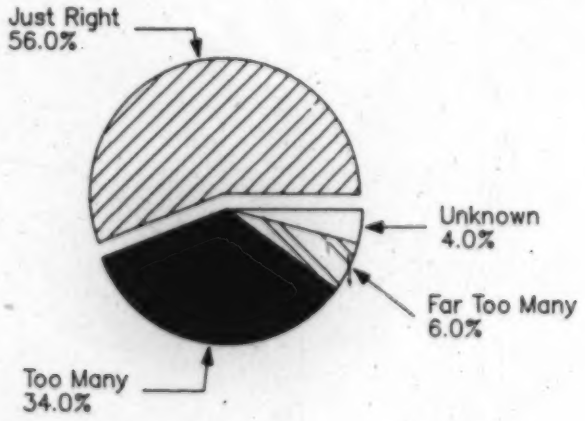
Table V-2 provides a bivariate analysis of visitor responses for those that freely stated that it was crowded at Point Pelee National Park. Of the sample freely stating that it was crowded (n=323), 63.5% felt that there were far too many or too many people present, and just over 36% stated the number of people present was just right. Positive forms of social interaction (i.e., willingness to share knowledge, birding information, etc.) which were recorded as being those things birders liked most about other birders at Pelee (Figure IV-9), may offset any potential negative impressions imposed by crowding factors.

The feelings that birders had about the number of people present at Point Pelee National Park and the surrounding area on a particular day was found to differ with the number of times they had been to the park in the past ($X^2=40.53$, d.f.=12; $p<.02$). In

FIGURE V–1. Perceptions of Crowding by Bird Watchers Visiting Point Pelee National Park – Spring, 1985

Concern For Number Of People

(percent of total)



Detract From Enjoyment

(percent of total)

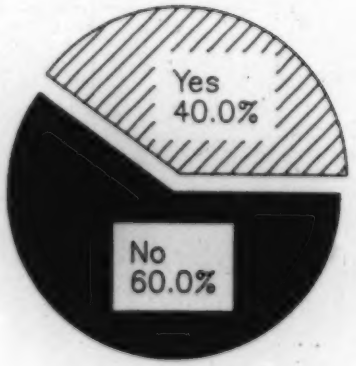


Table V-1. Relationship Between Perceptions of Crowding Questions Asked at Point Pelee National Park - Spring, 1985.

Concern For Numbers	Detract From Enjoyment		
	Yes	No	Total (n)
Far Too Many	11.7	1.0	(18)
Too Many	74.5	25.9	(156)
Just Right	13.8	73.1	(171)
Total	100.0	100.0	
(n)	(137)	(208)	(345)

$X^2 = 119.55$, d.f. = 2; $p<.05$

Table V-2. Relationship Between Concern For Number of People at Point Pelee National Park and Free Crowding Response - Spring, 1985.

Response	Concern For Number of People				
	Far Too Many	Too Many	Just Right	Too Few	Total (n)
Non Response	20.4	50.9	79.0	100.0	(629)
Response	79.6	49.1	21.0	0.0	(323)
Totals	100.0	100.0	100.0	100.0	
(n	(49)	(338)	(561)	(4)	(952)

$X^2 = 124.0$, d.f. = 3; $p<.05$

fact, 15.12% of the variability in feelings of crowded by birders can be explained by the number of previous visits made to Pelee, and area, in the past. Figure V-2 shows that those people who felt that there were far too many people in the park (n=49) had been to the park significantly more often in the past (averaging 27.9 visits) than those who felt that there were too many people in the park or that the number was just right (averaging 13.9 and 9.7 previous visits respectively).

Birders who have been to Pelee more often in the past for the purpose of bird watching (e.g., more than 15 times previously) many have established their personal expectancy norms, as they relate to perceptions of crowding, at a time when fewer people visited the park. They, therefore, perceive the current number of birders in the park as too many. The opposite is true for birders who have visited the park less often in the past. These peoples' personal crowding norms (expectations and perceptions of crowding) have been established more recently during times when spring use levels in the park were high. They, therefore, are more tolerant of greater numbers of people in the park. Similar findings and explanations for these findings have been presented by many recreation researchers in North America when examining the perceptions of crowding by past and more recent visitors (Ditton et al. 1982; Hammitt et al. 1982; Neilson and Endo 1977; Vaske et al. 1980).

The feelings that birders had about the number of people present in the park were also found to differ with the length of time (hours) that birders spent in the park and the surrounding area each day ($X^2=21.56$, d.f.=9; $p<.03$). Those bird watchers who felt that there were too many people present in the park (n=338) spent significantly more time birding each day, than those who felt that the number of people present was just right (averaging 10.18 and 9.49 hours respectively). Figure V-3 portrays graphically this difference in concern by birders with visitor numbers in the park by average length of time in the park. A possible explanation for this relationship is that those birders spending longer periods of time birding in the park each day came into contact with more people throughout the day and therefore have greater perceptions of crowding than those

FIGURE V–2. Relationshop Between Number Of Previous Visits To Pelee And Concerns With Visitor Numbers – Spring, 1985 (95% confidence interval)

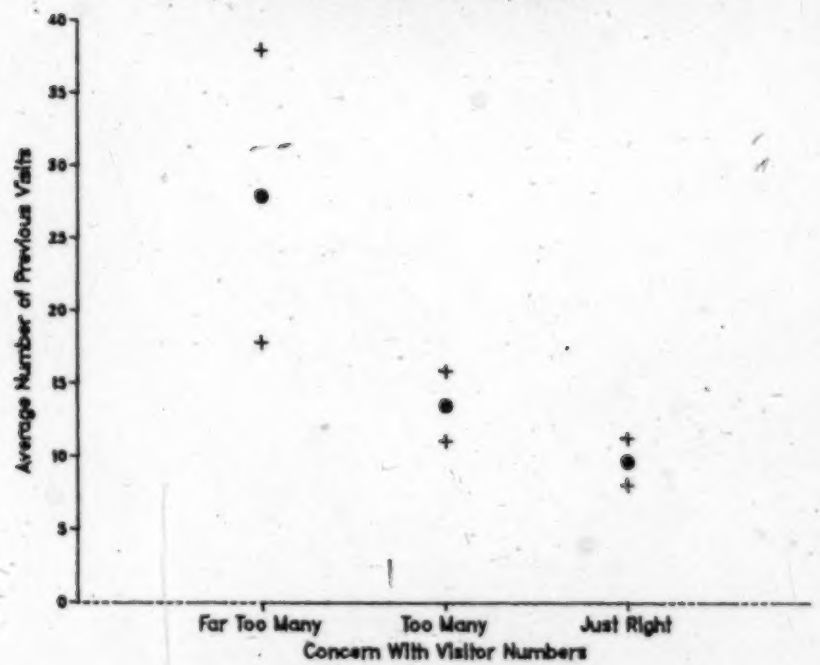
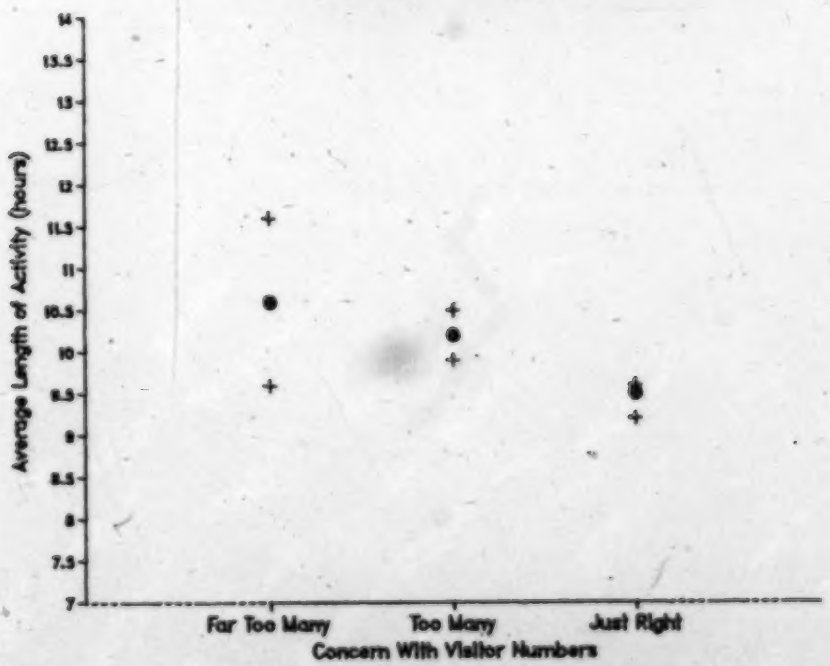


FIGURE V–3. Relationship Between Length Of Birding Activity And Concern With Visitor Number – Spring, 1985 (95% confidence interval)



spending fewer hours birding in the park each day.

During the open-ended response portion of the interview questionnaire birders were asked what they liked about birding at Point Pelee National Park (Part IV). Just over 50 percent of all visitor responses (n=782) were crowding related (Figure IV-9). Two significant relationships were found to exist between the free response of crowding and birder activity characteristics.

First, a significant relationship was found to exist between free response that it was crowded at Pelee and photographer type, as classified by photographic equipment in possession. In general, those photographers responding freely that it was crowded at Pelee tended to be more advanced than those not providing the crowded response. Thirty-five percent of photographers responding that it was crowded (n=74), were advanced photographers and 35.4% were snapshot photographers (Table V-3).

A significant relationship was also found to exist between free responses of the park being crowded and the number of times birders had been to the park previously. Table V-4 portrays this relationship. Of the sample freely responding that it was crowded at Pelee (n=329), the greatest number of crowding responses came from those birders who had been to the park 15-19 times previously (44.7%) and greater than 25 times previously (53.5%). The average number of previous visits was found to differ significantly with this crowding response ($F=23.4$, d.f.$=1$; $p<.05$). Birders responding that it was crowded had been to the park more often in the past, on average, than those not responding that is was crowded (averaging 16.7 and 9.6 previous visits respectively). This finding tends to re-affirm those results presented earlier.

No significant relationship between actual density and perceived crowding was found for bird watchers at Point Pelee National Park when daily gate counts were correlated with visitor responses. In fact, contrary to results of many recreation visitor studies examining the same relationship (Lee 1977; Heberlein and Vaske 1977; Absher and Lee 1981; Ditton et al. 1982) the findings at Pelee tend to suggest that as use levels increased, bird watchers were less likely to evaluate the experience as crowded ($r=-.028$;

Table V-3. Variation in Free Crowding Response and Photographer Type Visiting at Point Pelee National Park - Spring, 1985.

Free Crowding Response	Type of Photographer			
	Snapshot	Bird	Advanced	Total (n)
Yes	15.5	35.4	35	(74)
No	84.5	64.4	65.0	(175)
Total	100.0	100.0	100.0	
(n)	(71)	(158)	(20)	(249)

$X^2 = 9.02$, d.f. = 2; $p<.05$

Table V-4. Variation in Free Crowding Response and Number of Previous Visits to Point Pelee National Park - Spring, 1985.

Crowding Response	Number of Previous Visits to Pelee						
	0-4	5-9	10-14	15-19	20-24	25 +	Total (n)
Non Response	76.6	59.2	62.9	55.3	64.4	46.5	(673)
Response	23.4	40.8	37.1	44.7	25.6	53.5	(329)
Total	100.0	100.0	100.0	100.0	100.0	100.0	
(n)	(529)	(174)	(89)	(38)	(45)	(127)	(1002)

$X^2 = 13.98$, d.f. = 6; $p<.05$

p=.391).

Study results suggest that most bird watchers do not mind the large numbers of people present at Point Pelee each day. This may be because new generations of bird watchers appear to expect and be tolerant of greater numbers of birders and that older generations of birders, or those less tolerant of greater numbers of birders either redefine their expectations over time or are being displaced. It is likely that user satisfactions, at least presently, will remain reasonably high despite the changing character of the recreation experience. An exploratory interview conducted with bird watchers in near-by Rhondo Provincial Park suggested that some displacement due to crowding at Pelee may already be taking place.

Birder Activity Conflicts

The data indicate that a wide spectrum of visitor groups utilize the resource at Point Pelee during the peak birding season of April 25 to May 20, and while bird watchers are what this researcher perceives to be the primary user group (80 to 90 percent of the total), other general user groups such as fishermen, bicyclers, joggers, swimmers, picnickers, and school groups frequent the park throughout this same time period. As a result of this diversity of visitor use, asymmetrical antipathy conflicts arise. Asymmetrical antipathy conflicts are a special kind of user dissatisfaction arising from the common use of resources by distinctly different user groups and where in the interaction, one group more negatively affects the other.

In the Pelee framework there exists two different kinds of asymmetrical antipathy. The first we refer to as typological asymmetrical antipathy, the one-sided conflict that arises between different typological user groups (e.g., bird watchers and fisherman). The second is sub-typological asymmetrical antipathy, the one-sided conflict that arises between bird watcher sub-typologies (e.g., watchers and hard listers). When discrepancies exist between desired goals and actual outcomes, for both typological and sub-typological user groups, overall satisfaction declines. The extent of the satisfaction

decline is influenced by the degree to which various user groups perceive each other as dissimilar (Graefe et al. 1984).

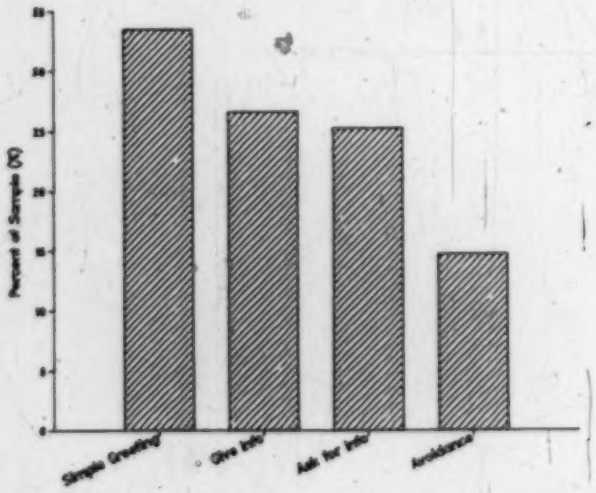
Study results suggest that both types of conflict occur at Pelee. When asked what bird watchers liked least about birding at Pelee, 7.8% of those who responded (n=782) volunteered that they did not like other user groups being present in the park, specifically fisherman and school groups. This figure portrays typological assymetrical antipathy conflicts and is probably much higher than the above figure may suggest as other observations, overheard comments, and casually reported comments suggest a much higher frequency of occurrence. The second type, sub-typological assymetrical antipathy, showed up in the results obtained by asking bird watchers what they liked least about other birders at Point Pelee. Of those who responded (n=533), 21.8% said that they did not like the competition associated with listing; 5.8% said that they did not like photographers; and 40.7% said that they did not like the environmental disturbance caused by photographers, listers, and organized groups of bird watchers.

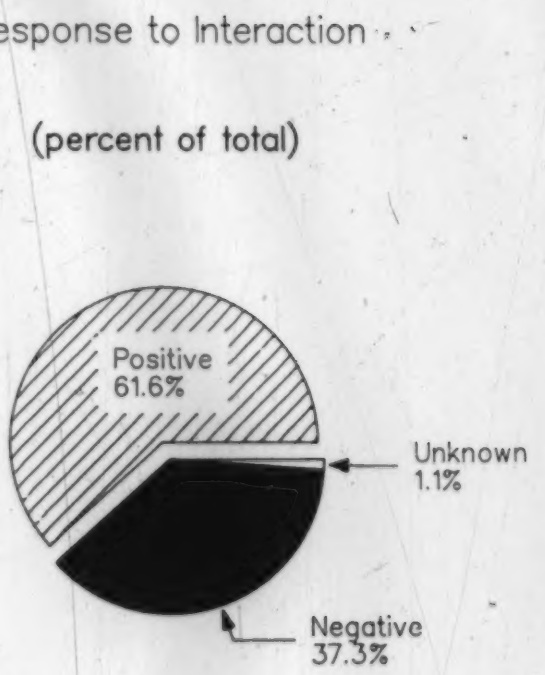
Visitor Interaction Participant Observation

A total of 576 visitor interaction observations were made. Figure V-4 provides a graphic summary of the interaction types observed. The most common type of birder interaction was the simple greeting: 33.5% of all visitor interactions. Providing information comprised 26.6%, asking for information 25.2%, and interaction avoidance 14.7%. A majority of the responses to interactions were positive (61.6%), with 37.3% being negative.

A positive birder response to a social interaction involved the positive recognition and complete response to a social interaction inquiry (i.e., taking the time to provide birding information when asked in a friendly and pleasant manner). A negative response entailed a nonrecognition of the social interaction inquiry of another birder, or it entailed providing only a very short, often incomplete response or recognition of the social interaction (i.e., no eye contact or outward appearance that the person to whom the inquiry was made acknowledged the interaction).

FIGURE V–4. Social Interactions By Bird Watchers Visiting Point Pelee National Park – Spring, 1985





The average duration of visitor interactions, regardless of interaction type, was 92.5 seconds (1.5 minutes). This length of interaction varied from no interaction at all (0 seconds) to 900 seconds (15 minutes). A 95% confidence interval of average interaction length by type of interaction is provided in Figure V-5. Average lengths of interaction were found to be significantly different ($F=12.19$, d.f.$=3$; $p<.01$) for each interaction type.

Providing (giving) information, which as the name implies involved providing birding information to passing birders (usually unsolicited), lasted an average of 124.5 seconds. Asking passing birders for birding related information lasted an average of 105.1 seconds. Simple greetings, friendly exchanges of greetings, averaged almost one minute (44.1 seconds). Avoidance, that interaction type where birders ignored or attempted to avoid social interaction with others, averaged 19.7 seconds. A significant relationship was found to exist when examining reaction of birders to social interactions to others and birder type ($X^2 = 17.07$, d.f.$=2$; $p<.01$). When examining reactions types by level of birder (Figure V-6) it was found that novice birders, as determined through a combination of perceived experience level, behavior in the field, verbal indicators, and observed birding techniques, reacted more negatively to social interaction with others (53.2% of the time) than either general or advanced birders (35.6% and 22% of the time respectively).

When examining photographers, interaction types and durations of those interactions were found not to differ significantly. Reaction to social interactions however, were found to differ significantly by photographer type. Of the 143 visitor interactions which elicited responses from photographers, 55.9% were positive and 44.1% were negative (Table V-5).

Advanced photographers (as classified by amount of equipment in possession and obvious experience) tended to react more negatively to social interaction with others (63.3% of the time) than either bird photographers or snapshot photographers (37% and 53.8% of the time respectively). Obtaining a quality bird photograph often required a large commitment of time and money. Stalking bird species for photographs can be frustrating and tedious work. As a result, advanced photographers were found to be more easily annoyed by interruptions from others than other photographer types especially when those interruptions often entailed

FIGURE V–5. Relationship Between Interaction Type
And Length of Social Interaction By Pelee Birders – Spring, 1985
(95% confidence interval)

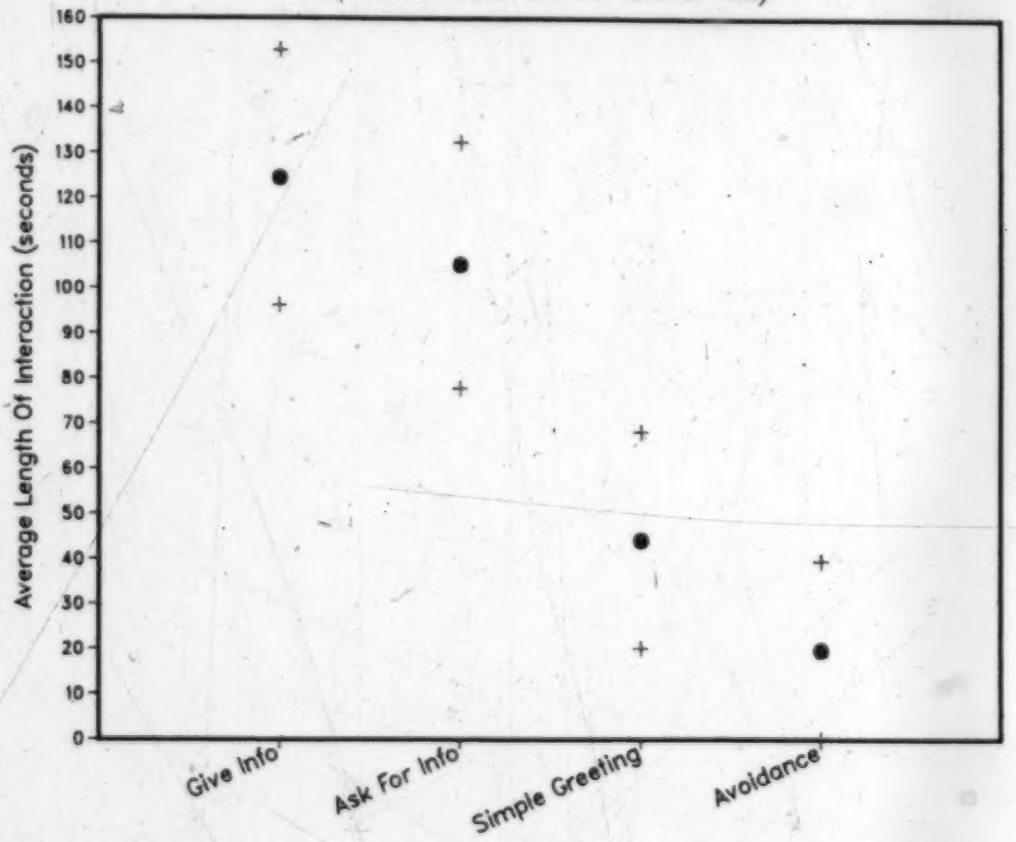


FIGURE V–6. Reaction To Social Interaction By Birder Type At Point Pelee National Park – Spring, 1985

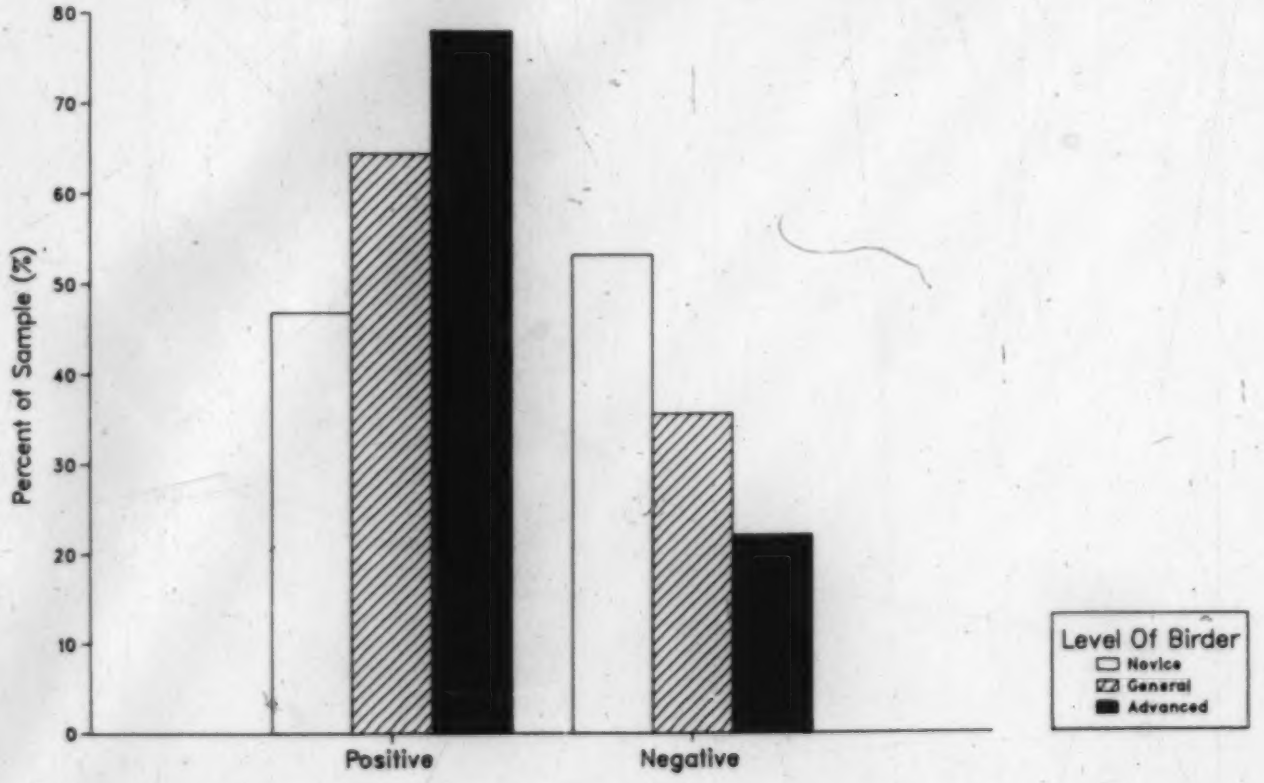


Table V-5. Reaction to Interactions by Type of Photographer at Point Pelee National Park - Spring, 1985.

Reaction To Interaction	Photographer Type			
	Snapshot	Bird	Advanced	Total (n)
Positive	46.1	63.0	36.7	(80)
Negative	53.9	37.0	63.3	(63)
Total	100.0	100.0	100.0	
(n)	(13)	(100)	(30)	(143)

$X^2 = 7.05$, d.f. = 2; $p<.05$

Table V-6. Variation in Birder Reaction to Social Interaction by Time of Day at Point Pelee National Park - Spring, 1985.

Reaction To	Time of Day				
	Early Morning	Late Morning	Early Afternoon	Late Afternoon	Total (n)
Positive	66.0	100.0	84.5	100.0	(140)
Negative	34.0	0.0	15.5	0.0	(32)
Total	100.0	100.0	100.0	100.0	
(n)	(47)	(5)	(103)	(17)	(172)

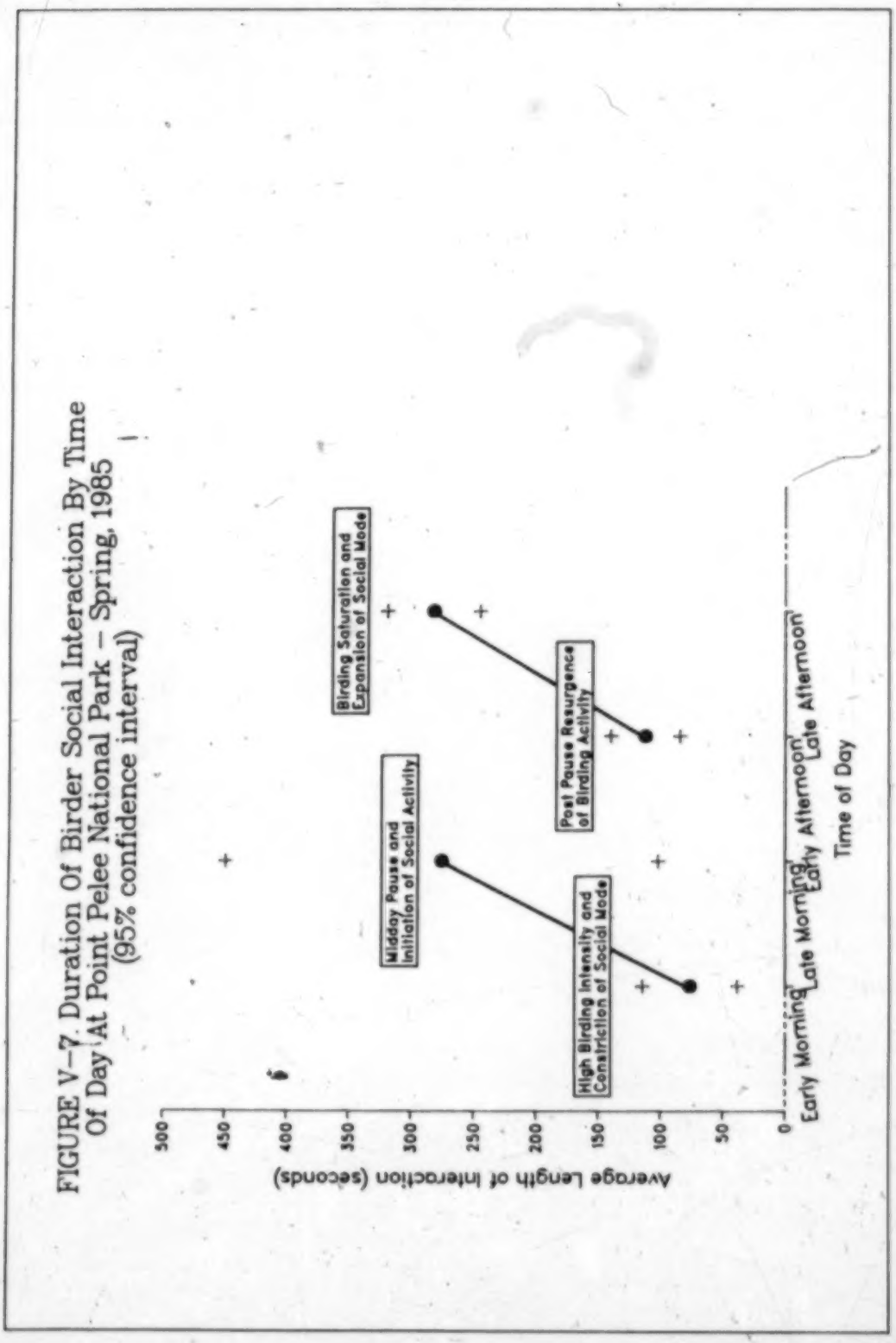
$X^2 = 13.07$, d.f. = 3; $p<.05$

repetitive questioning about photographic equipment. This group of photographers, therefore, are found to react more negatively when disturbed.

The time of day during which birding activities were taking place was found to have a significant effect upon the duration of the social interaction ($X^2=24.52$, d.f.=9; $p<.01$). Social interactions in the early morning were found to be significantly shorter in duration, averaging 76.4 seconds, than in the late morning and late afternoon (averaging 276 and 282.5 seconds respectively). Figure V-7 portrays this relationship graphically. When negative reactions to social interactions did occur (Table V-6), they tended to occur more often in the early morning and in the early afternoon than in the late morning and late afternoon.

Bird watching is a highly intensified activity, particularly in the early morning when bird species are most visible and abundant and when birders are anticipating most seeing new and rare bird species. This is also the time of day when there are the most birder in the park and visitor contacts most frequent. It is this time, therefore, that birders are most sensitive to disturbances or interruptions from others and so the time that solicited interactions with others least frequent (constriction of social mode). Any interaction initiations by others at this time, in the event that they do take place, are usually responded to negatively (i.e., a quick response or avoidance). As the day progresses into the late morning, the intensity of the birding activity decreased. This midday pause may have been a result of a number of factors including visitor fatigue, a decrease in the number of bird species available for viewing, and a need for something to eat. This period of time is also characterized by an initiation of social activities where birders share birding information with each other (i.e., what bird species they had seen during the mornings activities and where they saw these birds). The greater variation in average interaction lengths during this time of day is most likely a result of a decrease in concentrated birding efforts by some and the continued concentration and participation in the activity by others. The early afternoon period involved a post pause resurgence in birding activities. During this period birders are rested up from their break, had new bird information at hand, and are ready for more active bird watching in the field. This period is also characterized by a renewed constriction of social mode, although not to the degree that it was

FIGURE V–7. Duration Of Birder Social Interaction By Time Of Day At Point Pelee National Park – Spring, 1985
(95% confidence interval)



during the morning hours. The late afternoon period (2:00 to 4:00 p.m., and on into the evening) is a time of renewed visitor fatigue through birding saturation and a renewed expansion of social mode. Bird watchers are not only tired from the days activities, but had seen enough birds for the day. It is this period of time that social interaction increased, with birders discussing the days activities and the birding highlights.

E. Social Impact Management Implications

The results of this portion of the bird watcher study have been directed at describing the social impacts and interactions between birders during bird watching activities at Point Pelee National Park's spring migration. The results indicate that birder activities involve a variety of social interactions between people with different expectations, preferences, and tolerances. There are however, some key factors which should be taken into consideration when attempting to manage a resource such as Point Pelee through the use of social capacities.

When examining birders' perceptions of crowding at Pelee it was found that a majority (56%) stated that the number of people in the park that particular day was just right. Similar results were found when birders were asked if the number of people in the park that day detracted from their enjoyment, with 60% stating no. With no further examination or comparison with other social impact studies, these results could potentially lead park managers to the conclusion that crowding is not an important factor at Pelee and that capacity limits on a social basis should not have to be made, particularly since 33% of those who felt that it was crowded at Pelee (n=174) also felt that the crowds did not detract from their enjoyment of the park. This conclusion however, could be an incorrect one.

General guidelines from which to determine the point where perceptions of crowdedness move from acceptable to unacceptable levels have recently been established (Shelby and Heberlein 1986). These guidelines, which could be used as rough evaluative standards, at least for high and low ends of the scale, are based upon the examination of a number of social impact studies dealing with perceptions of crowding for different recreation

settings and activities and ranking the perceived crowding on a percent basis. "If more than two thirds of the sample population say that they are crowded, it appears likely that capacity has been exceeded. Use limits should be considered, although further study would be needed to specify capacity. If less than one third of the visitors feel crowded, use levels are probably below capacity. The area may bear further watching if use is increasing, but crowding is not yet a major issue. For areas falling between one third and two thirds, no clear judgement can be made and more data should be collected" (Shelby and Heberlein 1986 p. 67).

The Pelee situation falls within this grey area. Limitations of the number of visitors into the park, therefore, should not be made until such time as an understanding of the feelings of crowdedness by birders is examined further.

Another factor which is important from a management standpoint, particularly when examining the use of the social capacity concept, is the fact that no significant relationship was found to exist between actual visitor density and perceived crowding by birders visiting Point Pelee National Park. This is a significant finding and tends to suggest that sheer number of visitors to Pelee does not solely determine perceptions of crowding and the quality of the birding experience offered in the park. Rather, the findings of this study tend to support the theory that perceptions of crowding may be more a function of visitor density in conjunction with a variety of other factors. These include previous experience in birding activities, past experience in the park, commitment to daily birding activities during visits to Point Pelee, perceptions of resource impacts, conflict between park users, and individual expectation and preferences (Gramann and Burdge 1984; Bultena et al. 1981; Shelby et al. 1983). Should this be the case, management strategies to reduce visitor impacts on the park environment (i.e., flushing birds and off trail use) and reduction of visitor conflicts could potentially decrease overall perceptions of crowding, thereby enhancing the birding experience available at Point Pelee.

Strategies to reduce environmental impacts are beyond the scope of this chapter. Reduction in visitor conflicts however, could take a variety of forms. The first step is the recognition of birder sub-typologies (Butler and Fenton 1986). Results indicated that certain

birder types had greater perceptions of crowding than other types. These include more experienced birders (i.e., those that had been to the park more often in the past), dedicated bird watchers who spent long hours birding in the park each day, and advanced photographers. Expanded interpretive programming which targets these key birder sub-typologies could potentially enhance their birding experience thus reducing their perceptions of crowding. In order to obtain a better understanding of these subtypological assymetrical antipathy conflicts and manage the resource using social capacities, further examination is warranted.

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VI. Paper III: Ecological Impacts of Bird Watchers at Point Pelee National Park

A. Introduction

Bird watching has traditionally been seen as a nonconsumptive wildlife-related activity in which there is little or no impact on the natural resource base. In the past ten years however, in specified locations the activity has begun to place stress on both the birds and associated habitats (Graham 1980; Webster 1980; Wilkes 1977). This has created a cause for concern to resource managers who must minimize this impact in order to meet their mandates of resource protection.

Environmental impacts are of special concern at Pelee since the park falls within the northern limits of a Canadian threatened ecosystem called Carolinian. Point Pelee National Park encompasses almost 16 square kilometers of this remnant forest ecosystem, an ecosystem which includes the northern most limits of plant and animal species found nowhere else in Canada. Point Pelee's prime national role (Parks Canada 1982a) is to protect, manage, and present its nationally and internationally significant geomorphological and biological resources (i.e., landform, Carolinian vegetation associations, flora and fauna communities, and insect and bird migration). This prime protection role poses a dilemma for park managers who must strike a compromise between preservation and use, particularly since visitor use and appreciation are important components of the role of national parks of Canada (Parks Canada 1984).

Point Pelee has become one of the most famous locations in the world for watching the migration of birds during the spring months of April and May (Harrison 1976). Presently some 60,000 to 80,000 gate visits of bird watchers are recorded during the spring passerine migration, involving more than 20,000 individual visitors. On a busy day during the peak of this migration 6,000 people can be found within the confines of the park's 6.2 square kilometer landbase. Of these, 70% (4,200 individuals) can be found in the Tip Area at any one time.

Various studies have been carried out that deal with the impacts of recreation activities on both vegetation and wildlife species (Boyle and Samson 1985; Liddle 1975; Ream 1980; Wall and Wright 1977). Few however, have attempted to deal quantitatively in predictive terms with the specific issues associated with the ecological influences of an expanding base of user clientele. Those efforts which have attempted to address the ecological implications of birding activities (Parks Canada 1977,1978,1982b) have focused largely on short-term solutions without an adequate data base to understand or even predict in qualitative terms, the relationships and consequences of alternative levels, types, and patterns of use on the immediate environment.

This portion of the bird watcher study carried out at Point Pelee National Park was initiated in an attempt to better understand the ecological implications of birder activities.

B. Study Area Location and Description

Point Pelee National Park is a day-use park located in the southern part of Essex County in southern Ontario, 80 kilometers southwest of the large urban center of Windsor-Detroit (Figure I-1). The national park is a 15 kilometer sandspit formation extending into the western basin of Lake Erie. With a total area of only 16 square kilometers, 29% of which are drylands and 71% freshwater marsh, Point Pelee is one of the smallest parks in the Canadian Park System. A more detailed description of Point Pelee National Park is provided in Part I.

C. Methodology

The ecological impact portion of the research study at Point Pelee was used to measure and quantify the types and extent of off trail use by bird watchers. Three different methodological components were utilized. The first was a non-interview methodology which entailed unobtrusive participant observations of bird watchers as they related to off trail use and the impacts associated with that use. The second involved systematic trail measurements which attempted to qualify the extent of vegetational impacts prior to and following the

birding season. The third component involved the systematic observations of bird watcher viewing habits of trail impact-related and regional birding information interpretive displays located in the park Visitor Center. Each of these methodologies is described in more detail below.

Off Trail Impact Participant Observations

The off trail impact portion of the ecological impact study was designed to measure the types and extent of off trail use by bird watchers at Point Pelee National Park. The advantages and reasons for utilizing the unobtrusive participant observation methodology was discussed in Part V.

The types of participant observations made in the field included recording who the bird watchers were (demographic profiles), total time spent off trails (minutes), total distance travelled off official trails (meters), whether birds were being flushed as a result of the off trail use, whether vegetation was trampled, and the type of off trail impact that occurred; see the Off trail Impact Participant Observation Form (Appendix M).

The sample were the bird watchers at Point Pelee National Park actively participating in birding activities between May 1 and May 25, 1985.

The sampling technique utilized and data preparation and analysis are the same as those described in Part V. The Off trail Impact Participant Observation Code Book is presented in Appendix N.

Trail Inventory

The trail measurement component of the ecological impact study involved the measurement and classification of unofficial trails located south of the visitor center at Point Pelee National Park.

The sampling technique involved the measurement of all unofficial trails (those not designated by the park as trails on the Park Trail Map) at the beginning of the birding season: May 3-6, 1985. A sub-sample of these unofficial trails was then selected for

remeasurement at the end of the birding season (May 20, 1985) so that comparisons and effects of birding activities could be quantified.

All unofficial trails greater that 20 centimeters in width (trails with a width of less than 20 centimeters were assumed to be game trails) were classified as secondary trails. The entrance to each secondary trail was located and recorded on a master trail map. This master trail map shows the location of both official and unofficial (secondary) trails situated in the park. The total length of each secondary trail was determined using a measuring wheel (1 revolution = 3 meters). The width of each 'secondary trail' was measured (to the nearest centimeter) at a distance of three meters in from the trail mouth. Total vegetation cover was then estimated on a percentage basis using a 25 x 25 centimeter quadrat placed 3 meters in from the trail mouth. Photographs were then taken from a point 3 meters in from the trail mouth and looking down the trail corridor. This procedure was then repeated for each secondary trail encountered in the study area.

At the end of the birding season, a random selection of the secondary trails were made and measurements described above repeated for each trail selected. This procedure enabled a comparison to be made and provided quantifiable effects of birding activities on the vegetation resources of the park.

Data preparation and analysis procedures involved the compilation of unofficial (secondary) trail widths and lengths and a comparative analysis of this data with official trails of the park south of the visitor center and with data collected after the birding season. This pre-post trail comparative analysis provided insight as to the occurrence of new trail formation and loss of vegetation cover associated with increased trail widths. A mapping exercise was carried out showing the location of secondary trails south of the visitor center and where they are located in relation to official park trails.

Visitor Display Effectiveness

The visitor display component of the ecological impact study was designed as an observational exercise in an attempt to measure the effectiveness of the interpretive displays

on impacts created by park visitors and regional birding information. Displays were located in the park visitor center.

The sample were those bird watchers entering the visitor center for specific periods of time each day from May 10-16, 1985.

The sampling techniques used are as follows. Each sampling day (n=5) was divided into four time periods: early morning, late morning, early afternoon, and late afternoon. A time period for each of these days was then selected randomly from a hat. Observations were then made for one hour during each of these five time periods. On a sampling day the observer would enter the visitor center 5 to 10 minutes prior to the time at which observations were to begin and find a seat where there was a clear view of the visitor center entrances, the impact display, and the regional birding information display. At the specified sampling time observations and note was made of the following variables: 1) number of people entering the visitor center; 2) number of people viewing the impact display; 3) number of people viewing the regional information display; 4) the length of time (in seconds) that each individual viewed each of the displays; and 5) the sex of the person viewing the displays. A Visitor Display Effectiveness Observation Form is presented in Appendix O.

Data preparation and analysis procedures involved generating summary statistics of each observed variable utilizing SPSS; Statistical Package for the Social Sciences (Nie et al. 1975). Variables for which summary statistics were generated included total viewing times for each display and average viewing times per person for each display. Student t-tests were then carried out to find out if the average viewing times were significantly different by time of day.

D. Results and Discussion

Off Trail Impact Participant Observations

The results from this section of the ecological impact study deal with each variable directly related to off trail impacts associated with bird watcher activities at Point Pelee .

National Park. Unobtrusive participant observations (n=412) were made of birders in various locations throughout the park on a randomized site and time sampling design discussed earlier, 69% of these observations were made on weekends and 31% on weekdays.

Time Off Trails

Observations indicated that off trail excursions lasted up to 20.7 minutes with the average being 6.1 (Table VI-1). A majority (70.6%) of off trail use lasted between 1 and 5 minutes. This time off designated trails was found to differ significantly as to whether or not the birder was a photographer ($F=18.2$, d.f.$=1$; $p<.01$). Table VI-2 indicates that while a majority of the off trail use (77% of the total) can be attributed to non-photographers, photographers spent 41% (3.5 minutes) longer, on average, off designated trails than did non-photographers.

Duration of off trail use was also found to differ significantly by photographer type ($F=4.47$, d.f.$=2$; $p<.01$), with advanced photographers (as classified by amount of equipment in possession) spending 56.5% (7 minutes) longer, on average, off designated trails than either snapshot or general bird photographers (Figure VI-1). Advanced photographers take longer to find and line-up potential bird pictures, accounting for this longer average time off of trails.

Advanced birders, as classified through knowledge level and experience, were found to spend significantly longer durations of time, on average, off designated trails than either novice or general birders ($F=7.5$, d.f.$=2$; $p<.02$). Figure VI-2 indicates that advanced birders spent up to 39% longer (3.3 minutes) than either novice or general birders.

Distance Off Trails

Bird watchers at Point Pelee National Park travelled an average of 12.3 meters off designated trails during each off trail excursion (Table VI-3). This distance of off trail travel varied from not leaving designated trails to travelling up to 300 meters. A majority of off trail travel (75.7%) involved excursions of 1 to 10 meters.

Table VI-1. Time Off Trails by Bird Watchers Visiting Point Pelee National Park - Spring, 1985.

Average Time[1]	Percent of Off-trail Use for Each Time Interval[2]					
	1-5	6-10	11-15	16-20	21-90	Unknown
6.17±14.6	70.6	14.3	4.9	3.6	1.5	5.1

[1]Confidence Interval, $p<.05$
[2]n = 412

Table VI-2. Time Off Trails by Photographer at Point Pelee National Park - Spring, 1985.

Photographer	Frequency	Average Time (minutes)[1]
Yes	90	8.5±2.4
No	286	5.0±0.5
Total	376	

[1]Confidence Interval; $p<.05$

Table VI-3. Distance Travelled Off Trails by Bird Watchers at Point Pelee National Park - Spring, 1985.

Average Distance[1]	Percent of Off-trail Use for Each Distance Interval[2]					
	1-5	6-10	11-15	16-20	21-25	26-300
12.3±50.4	58	17.7	2.9	6.6	1.9	11.2

[1]Confidence Interval, $p<.05$
[2]n = 412

FIGURE VI–1. Average Time Off Trails By Photographers Visiting Point Pelee National Park – Spring, 1985 (95% confidence interval)

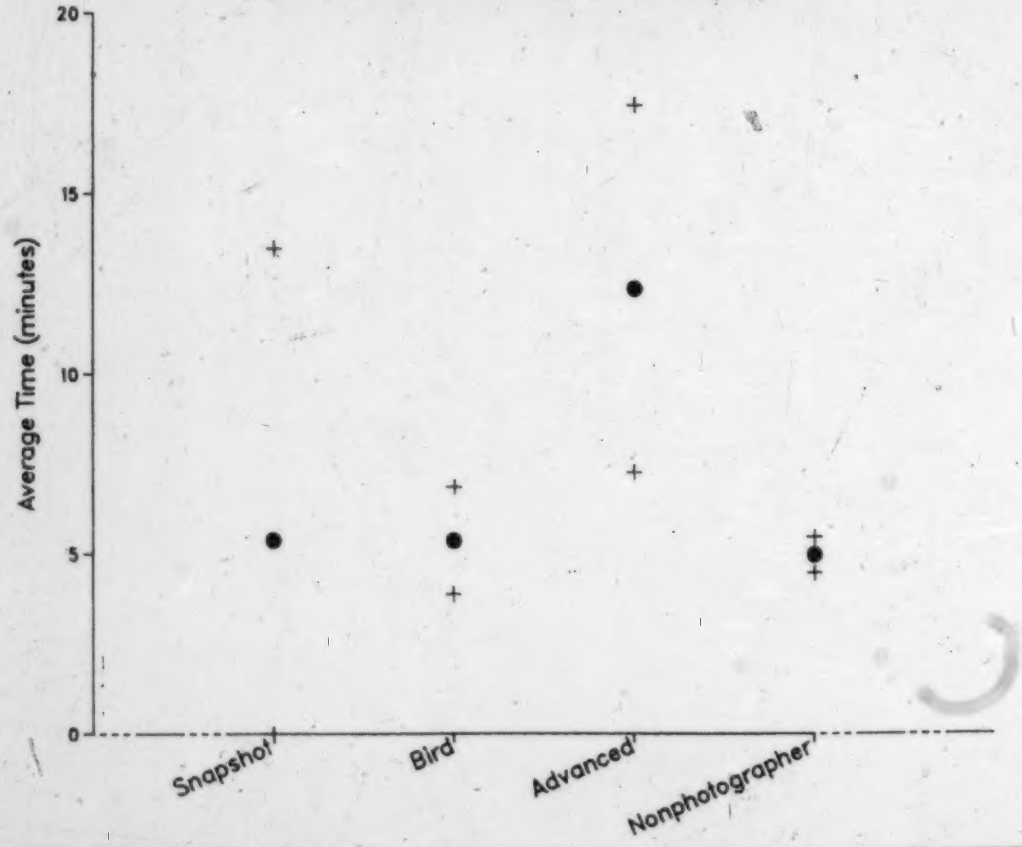


FIGURE VI–2. Average Time Off Trails By Birder Type At Point Pelee National Park – Spring, 1985 (95% confidence interval)

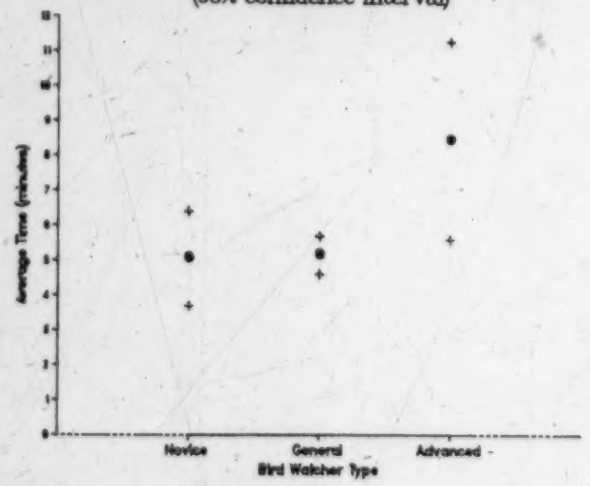
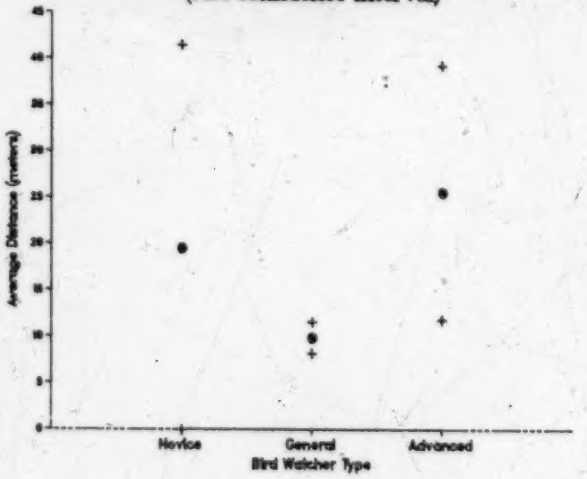


FIGURE VI–3. Average Distance Travelled Off Designated Trails By Birder Type at Pelee National Park – Spring, 1985 (95% confidence interval)



Distance travelled off designated trails was found to differ significantly by type of birder involved ($F=8.36$, d.f.$=2$; $p<.01$). Figure VI-3 shows that advanced birders travelled up to 61% further (15.7 meters) off trail, on average, than general birders. Advanced birders, usually hard listers, travel long distances off of designated trails to see species required for the list, even if they know that they should not be going off of designated trails (illusion of central position).

The tendency for advanced birders to spent longer periods of time off designated trails and to travel further during these excursions may in part be explained by competition and peer group pressure. Alderman (1974) recognizes three categories of competition, all which play a role in explaining this phenomenon. The first is personal competition against another person(s) of the same ability (group of peers). The second is competition against an objective or external standard; in this case the need to be the first person to see, list, and make known the new or rare bird species in the area. The third category is competition against oneself to better oneself; the need to make the first sighting of a particular species because you did it the year before. All of these categories help to explain the exploratory nature of advanced birders who travel to more remote areas in search of new or rare species of birds more often than other types of bird watchers visiting the park.

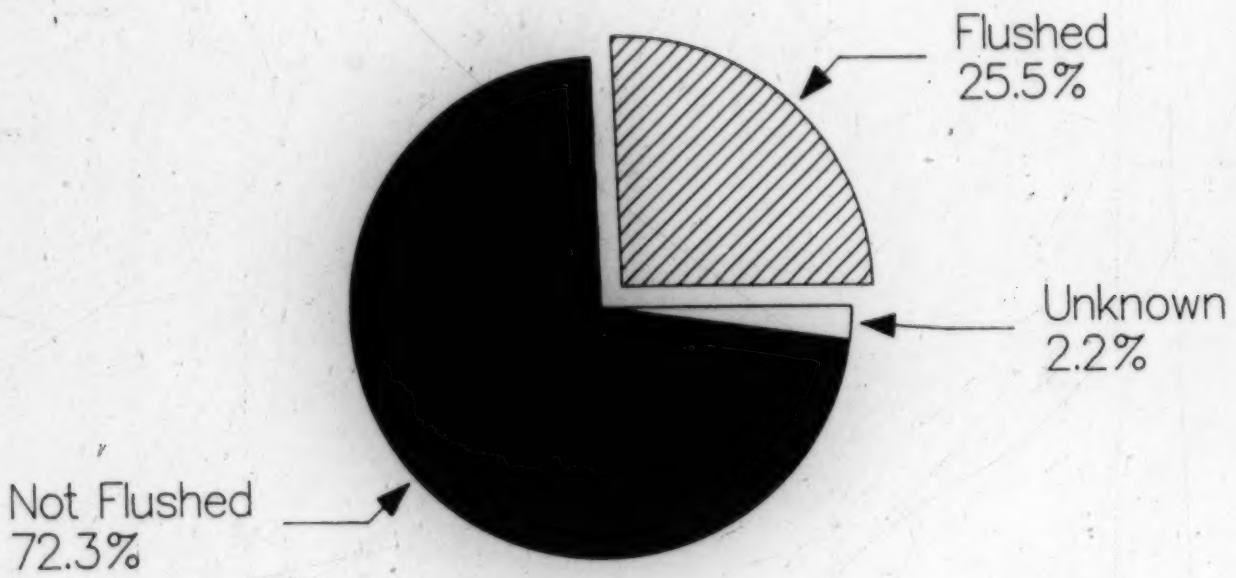
No relationship was found when examining the association between advanced photographers and distance travelled as there was with time of off trail use. This tends to suggest that photographers spent longer periods of time setting up potential photographs than travelling in search for these opportunities. This activity then, is not as exploratory in nature as those carried out by advanced birders.

Flushing of Birds

Whether or not birding activities resulted in deliberate or inadvertent flushing of the bird or birds under observation was also recorded. Of the 412 individual observations, nearly 26% resulted in flushing (Figure VI-4). Although the effects of flushing disturbance on spring migrants, who are already potentially stressed, are not well

FIGURE VI–4. Flushing Occurrence of Birds by Bird Watchers At Point Pelee National Park – Spring, 1985

(percent of total)



understood, it is known that even low amounts of visitor harassment can potentially alter behavior patterns and influence the reproductive and survival rates of bird species. When birds are grounded at Pelee by adverse weather phenomena they tend to be weak and particularly susceptible to becoming stressed through harassment, yet that situation is also one most anticipated and preferred by birders for viewing and photographic opportunities.

A significant relationship was found to exist between occurrence of flushing birds during observation by bird watchers with the level of birder. In the event that a bird is flushed, it was found that general birders were less likely to flush birds than novice or advanced birders. General birders flushed birds being observed only 20% of the time as compared to 43% of the time for novice and advanced birders (Table VI-4).

A possible explanation for this phenomenon would be that novice birders were the birder type most likely to inadvertently disturb or flush a bird during observation through lack of experience or technique. Advanced birders on the other hand, may be flushing the bird under observation deliberately for personal positive identification or to show less experienced birders the field marks used for species identification.

An example of a situation similar to those described above was observed in the Sparrow Field area. Several bird watchers were gathered around an area in which a Harris' Sparrow sighting had been reported, a species which had not been seen in the area for some years. An advanced birder, possibly the group leader, was observed to repeatedly flush the individual bird and pointing out field marks to the other members of the group.

As would be expected, the occurrence of flushing during observation was found to differ with the time off designated trails ($F=24.01$, d.f.$=1$; $p<.01$) and with the distance travelled off designated trails ($F=14.46$, d.f.$=1$; $p<.01$). Table VI-5 shows that birders who caused the bird under observation to flush spent up to 4 minutes longer, on average, off designated trails than those off trail excursions not resulting in the flushing of birds. This result makes sense intuitively, for as the time spent off designated trails

Table VI-4. Variation in Bird Flushing Occurrence at Point Pelee National Park by Level of Birder Involved - Spring, 1985.

Flushing Occurrence	Level of Birder			Total (n)
	Novice	General	Advanced	
Yes	43	20	43	(91)
No	57	80	57	(279)
Total (n)	100 (28)	100 (295)	100 (47)	100 (370)

$X^2 = 16.57$, d.f. = 2; $p<.01$

Table VI-5. Bird Flushing Occurrence by Time Off Designated Trails at Point Pelee National Park

Flush	Frequency	Average Time Off Trails[1]
Yes	104	9.11±1.57
No	280	5.02±0.82
Totals	384	

[1]Confidence Interval; $p<.05$

Table VI-6. Bird Flushing Occurrence by Distance Travelled Off Designated Trails at Point Pelee National Park

Flush	Frequency	Average Distance Travelled (metre)[1]
Yes	104	20.34±8.49
No	298	9.36±1.61
Totals	398	

[1]Confidence Interval; $p<.05$

increase, the chances of flushing a bird (either inadvertently or deliberately) increases. Table VI-6 shows that as the distance travelled by birders off designated trails increased the chance of flushing a bird also increased. This relationship also makes sense intuitively, for as the distance travelled off designated trails in the search for birds increases, the greater the chance of flushing a bird; either inadvertently or deliberately.

Plant Damage

Observations revealed that all off trail excursions resulted in plant damage to some degree. The specific response of plants to recreation use is strongly related to the morphological characteristics of the plant species being affected (del Moral 1979). Since the plant species in the understory of the Carolinian forest ecosystem at Point Pelee are highly sensitive, especially during spring growth, birder off trail impacts may be of significant concern and could potentially result in short and long-term changes in species composition and density.

A significant relationship was found to exist between plant damage occurrence and type of photographer ($X^2=12.41$, d.f.=2; $p<.01$). Figure VI-5 shows that snapshot photographers were found to have less observed occurrences of plant damage in their photographic activities (5.5% of the total) than either bird or advanced photographers (51.6% and 42.9% respectively). This result may be explained by the fact that both advanced and bird photographers travel significantly further in their pursuit of birds for photographic opportunities, increasing their likelihood of damaging plants.

Type of Off Trail Impacts

Five different categories of off trail bird watcher impact were recorded at Pelee during the spring bird season (Figure IV-6). Forty-three percent of all observations (n=412) were classified as **margin viewing impacts** caused by the casual stepping off of trails or boardwalks to better observe bird species in the immediate trail corridor. **Exploratory impacts** accounted for 27% of the total and are caused by extended, purposeful off trail exploratory travel in search for and discovery of unseen bird species

FIGURE VI–5. Plant Damage Occurrence By Photographer Type At Point Pelee National Park – Spring, 1985

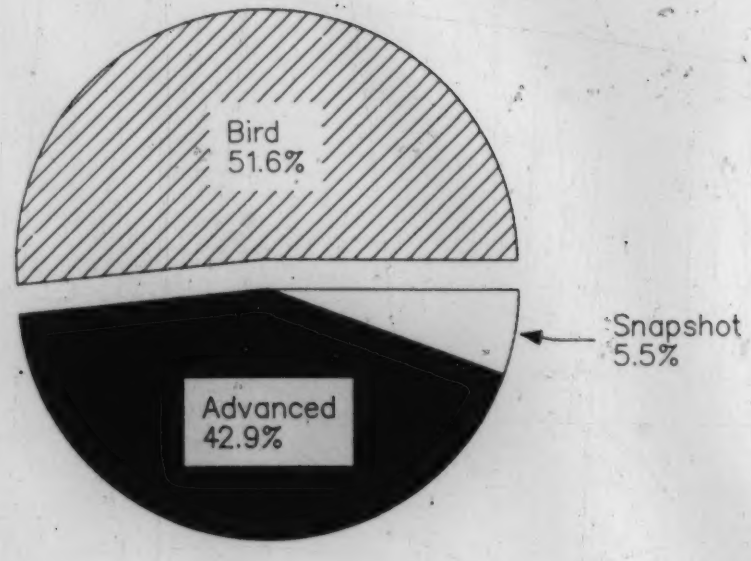
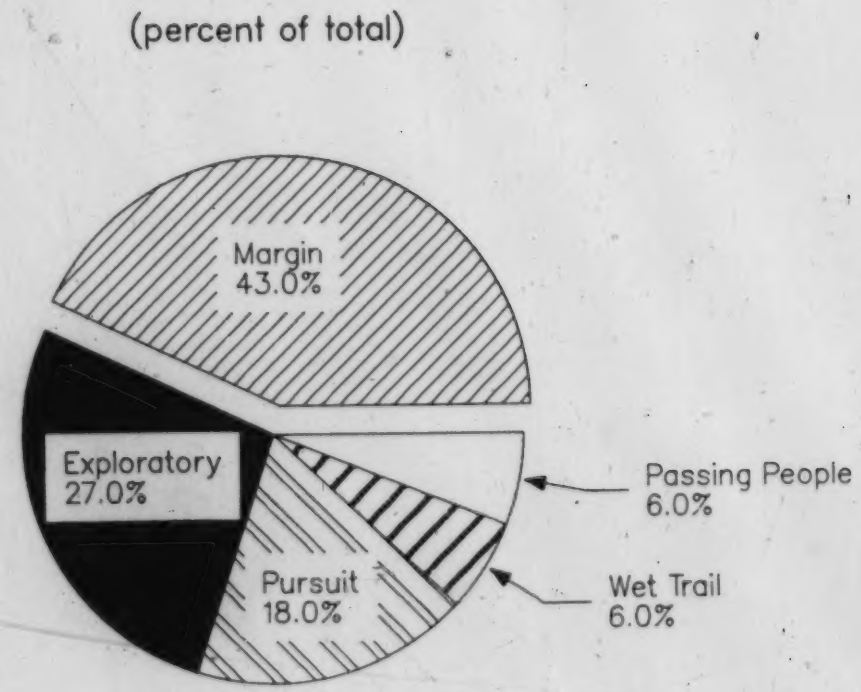


FIGURE VI–6. Categories Of Off Trail Impacts By Bird Watchers At Point Pelee National Park – Spring, 1985



in the understory vegetation and in the tree canopy. A category termed **pursuit impacts** accounted for 18% of the total and are a result of birders leaving designated trails in the active pursuit of highly desired bird species. Pursuit behaviors are governed by a factor of stimulus overload whereby concentration upon the primary stimulus (the desired bird) overrides an secondary concerns of environmental sensitivity, despite an awareness of and familiarity with potential impacts. An anticipatory anxiety to observe the desired bird and the synergetic group dynamics which accentuate the overall enthusiasm also contribute to this behavior. **People passing** stationary birders fixed in observation and blocking the trail accounted for 6% of the total off trail impacts, while **wet trail displacement**, which accounted for another 6% of the total off trail use, is a result of birders skirting wet and/or flooded portions of trail.

The types of impact occurring at Pelee was found to differ by the sex of the birder under observation when examining exploratory, pursuit, and wet trail impacts. Table VI-7 portrays that a majority of pursuit impacts are caused by men rather than women (39.6 and 23.8 percent more often respectively). This same table also reflects a tendency for females to cause a greater proportion of exploratory impacts than males (57.1 and 52.5 percent respectively). However, the distance of these exploratory off trail excursions was found to be less for females than males. This phenomenon may be a result of the recognition by females as an agent of impact on the environment causing them to reassess their exploratory activity and turn back or return to the formal trails.

The type of impacts occurring at Pelee were also found to vary by the age of the birders under observation when examining exploratory, pursuit, and wet trail impacts. Over one half of all exploratory impacts (53.7%) were caused by birders between the ages of 21 and 40 years. This same age class of birders accounted for 55.8% of all pursuit impacts and 87% of all wet trail impacts. Table VI-8 provides the bivariate relationship between impact type and age of birders observed.

Table VI-7. Variation in Impact Type by Sex of Observed Birders at Point Pelee National Park - Spring, 1985.

Type of Impact	Sex of Birder		Total (n)
	Male	Female	
Exploratory	52.5	57.1	(109)
Pursuit	39.6	23.8	(70)
Wet Trail	7.9	19.5	(23)
Total	100	100	
(n)	(139)	(63)	(202)

$X^2 = 12.7$, d.f. = 5; $p<.03$

Table VI-8. Variation in Impact Type by Age of Observed Birders at Point Pelee National Park - Spring, 1985.

Age Class (years)	Type of Impact			Total (n)
	Exploratory	Pursuit	Wet Trail	
11-20	6.5	5.7	0	(11)
21-30	14.8	22.9	8.7	(34)
31-40	38.9	32.8	78.3	(83)
41-50	13.0	24.3	8.7	(33)
51-60	18.5	8.6	4.3	(27)
61 +	8.3	5.7	0	(13)
Total	100.0	100.0	100.0	
(n)	(108)	(70)	(23)	(201)

$X^2 = 24.21$, d.f. = 10; $p<.02$

Trail Inventory

Unofficial paths formed through off trail use by bird watchers accounted for 62% of the total trail length in the study area south of the visitor center (Table VI-9). These paths accounted for 6.75 kilometers in total length, while only 4.15 kilometers of trail length in this area can be recognized as official, designated trails. Total area impacted through these undesignated paths amounts to 2700 square meters (nearly 40% of total trail area in the park). The total length and resulting area lost to unofficial path formation is of potential concern in Pelee. In perspective however, the impact or loss of park area to developments such as the paved bike trails which parallel the road is much greater.

Random samples of trails measured before the birding season were made again four weeks later at the end of spring season (n=15), to determine the extent of trail widening and/or new trail formation. Table VI-10 provides a summary of these changes.

While some widening and new trail formation did occur, it was not as substantial as had been hypothesized. Average increases in trail width amounted to 6.5 centimeters while decreases in percent cover averaged 5. Margin viewing along the boardwalk at the Tip was responsible for the greatest increase in trail width over the study period. These impacts represent a 400 percent increase in trail width from only 25 centimeters on either side of the boardwalk before the birding season to 100 centimeters on either side after the birding season. It is fortunate that most of the impact associated with off trail use occurs in the Tip area where the least important (least sensitive) plant resources exist. In retrospect, however, this area is also that most prone to natural disturbance. Very little, if any, new secondary trail formation (unofficial paths) occurred in the study area, although vegetation impacts caused by individuals wanderings were readily discernable. Locations of unofficial trails south of the Visitor Center are given in Figures VI-7 and VI-8.

Visitor Display Effectiveness

Total number of people entering the visitor center during each one hour time period (n=5) averaged 189, with just over 18% of these viewing the displays (Table VI-11). An

Table VI-9. Characteristics of Trails South of the Visitor Centre at Point Pelee National Park - Spring, 1985.

	Length of Trails (m)	Area (m^2)
Official	4152 (38.1%)	4100 (60.3%)
Unofficial	6754 (61.9%)	2700 (39.7%)
Total	10906 (100%)	6800 (100%)

Table VI-10. Changes in Trail Characteristics (Width and Cover) South of Visitor Centre at Point Pelee National Park - Spring, 1985.

Trail Number	Trail Width (centimeters)			Vegetation Cover (%)		
	Before	After	Change	Before	After	Change
(Woodland)						
1	30	43	+ 13	75-100	50-75	-25
1A	50	60	+ 10	0-25	0-25	0
2	30	30	0	0-25	0-25	0
4	60	60	0	0-25	0-25	0
5	25	40	+ 15	25-50	0-25	-25
6	20	35	+ 15	75-100	50-75	-25
7	35	50	+ 15	0-25	0-25	0
8	40	45	+ 5	25-50	25-50	0
11	50	50	0	0-25	0-25	0
24	40	40	0	50-75	50-75	0
(Tip)						
1	30	40	+ 10	75-100	75-100	0
2	40	40	0	0-25	0-25	0
4	50	40	- 10	0-25	0-25	0
7	40	45	+ 5	25-50	25-50	0
29	100	120	+ 20	0-25	0-25	0
Total			+ 98			-75
			$\bar{X}$ = 6.53 S = 8.25			$\bar{X}$ = -5.0 S = 10.35

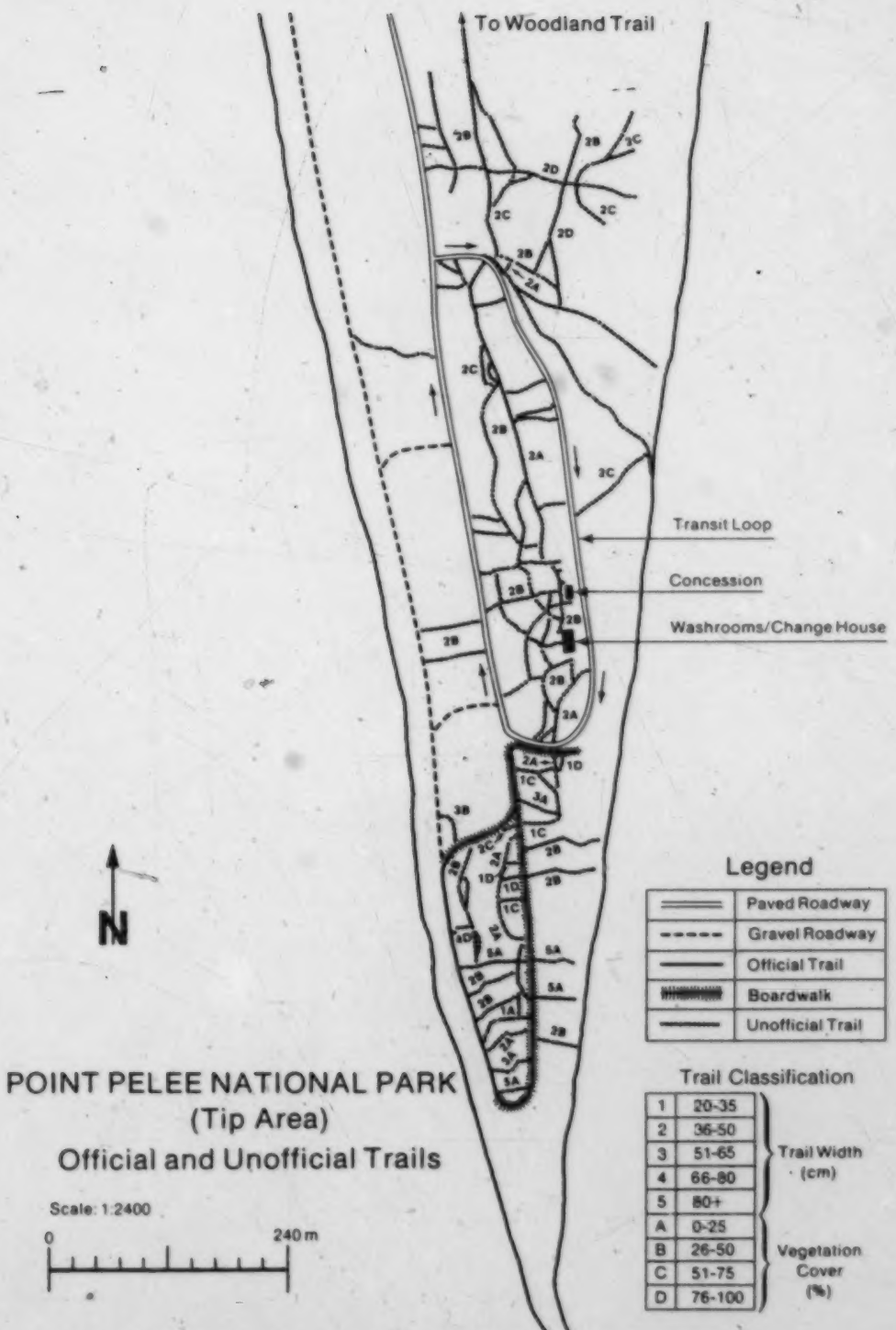


Figure VI-7. Unofficial trails south of the Visitor Center at Point Pelee National Park — Spring, 1985

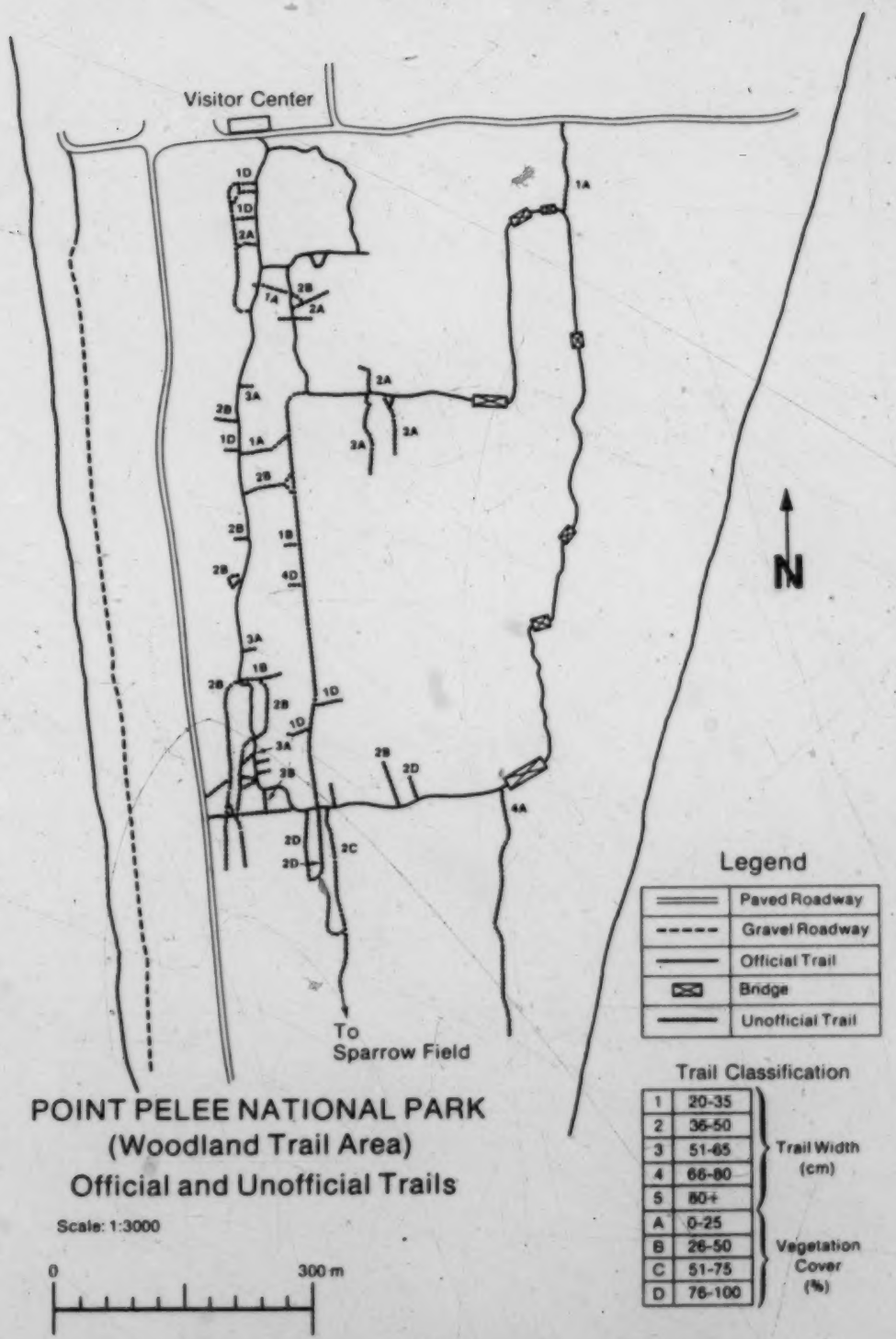


Figure VI-8. Unofficial trails south of the Visitor Center at Point Pelee National Park — Spring, 1985

Table VI-11. Bird Watcher Viewing Characteristics in Visitor Center at Point Pelee National Park - Spring, 1985[1]

Viewing Characteristics	Average Values[2]
Total Number Entering Visitor Center	188.6±107.6
Total Number Viewing Displays	34.2±17.2
Viewing Impact Display Only	2.4±3.6
Viewing Spreadout Display Only	15.2±5.5
Viewing Both Displays	16.6±12.9
Total Viewing Time (minutes)	40.9±24.5
Impact Display Viewing Time (min)	14.3±13.7
Spreadout Display Viewing Time (min)	25.6±15.8
Total Viewing Time Per Person (seconds)	69.9±19.3
Impact Display Viewing Time/Person (sec)	44.9±12.6
Spreadout Display Viewing Time/Person (sec)	51.8±17.3

[1]n = 5
[2]Confidence Interval; $p<.05$

average of 16.6 people viewed both displays each hour, while average number of birders viewing the impact and birding information displays were 2.4 and 15.2 respectively. Based upon a 12 hour day, these figures indicate that only 22% of the average total visitors entering the park viewed the impact and/or birding information displays.

In terms of the total amount of time spent viewing the ecological impact displays during each one hour time period, the average was 40.92 minutes. Resource impact display viewing averaged just over 14 minutes of each hour while viewing of the bird information display averaged 25.56 minutes.

During each viewing period, individual birders spent an average of 45 seconds at the visitor impact display and 52 seconds at the birding information display.

E. Ecological Impact Management Implications

A basic understanding of the types and relative amounts of resource impacts associated with birding activities at Pelee is primary in taking steps to alleviating those impacts. The implementation of management strategies to effectively reduce the impacts recognized in the inventory stage could take many forms. The following are but some of the management strategies that could be implemented to effectively reduce these ecological impacts.

Impacts associated with off trail use will never be eliminated completely, but of the measured resource impacts by birders, a majority (54%) may theoretically be reduced or eliminated through considerations of improved facility design. Wet trail displacement was found to account for 6% of the total and could be decreased substantially through the construction of boardwalks or trail fill in areas where the impacts are the greatest. This strategy has already been implemented at Pelee. Surface hardening and fill having been completed along portions of the Woodland Trail, an area particularly prone to spring flooding during past seasons (ridge and trough management area southeast of Visitor Center).

Trail impacts associated with passing people and margin viewing account for a further 49% of the total and could be reduced through a number of boardwalk design modifications.

The first would include widening existing boardwalks and creating viewing nodes. These viewing nodes would allow birders to step aside, out of the way of the boardwalk traffic, and at the same time facilitate bird viewing. The Tip boardwalk provides a good case-in-point. The large increase in margin impacts on either side of the boardwalk caused by passing people and margin viewing (a 400% increase) are the result of congestion of large crowds during peak viewing periods. Increasing the boardwalk width from 50 to 100 centimeters in combination with construction of viewing nodes at regular intervals on either side of the boardwalk, could substantially reduce, if not eliminate, off trail impacts on the sensitive sand-shoreline environment.

The construction of more viewing towers, similar to those already found on the DeLaurier Trail should also be considered. These towers not only help to disperse visiting birders, reducing the potential impacts on the soil and vegetation resources, but moves people up to canopy level thereby increasing the viewing potential of bird species in the area, and as a result enhancing the birding experience offered by the park.

An additional 45% of the observed impacts (27% as exploratory and 18% as pursuit impact) could theoretically be reduced through behavior modification measures implemented through improved public education and the acknowledgement by individuals, as an agent for potential impact. These would probably take the form of more on-site interpretive signs (i.e., trail head exhibits), expanded exhibit content, and specialized, high quality interpretive pamphlets addressing the preference of sub-typology users (e.g., photographing birds at Pelee). This requirement is re-emphasized by the impact display viewing statistics which portray the relative ineffectiveness of the current Visitor Center impact display and the fact that 29% of the visitor population does not enter the visitor center.

The content of these interpretive exhibits and panels need to satisfy two basic, yet fundamental requirements. The first is based upon the need to expand the interpretive message past basic identification of park resources (i.e., birds, plants, amphibians/reptiles). Visiting birders scored well on general resource identification (with the exceptions of plants). They did not score well however, when asked for some follow-up natural history information.

An expansion of birder's knowledge of natural history information could potentially increase awareness of impacts created by birders and lead to a more environmentally aware and appreciative user group. The second consideration is the quality of the interpretive message. The higher education level of the user audience under review suggests that birder compliance with off trail regulations would be greatly enhanced if the reasons for implementing the management strategy are provided (Hendee and Catton 1968; Hendee and Campbell 1969). More highly educated users tend to evaluate the validity of a regulation based upon their personal assessment of whether or not they agree with it. In order to obtain this compliance, interpretive messages must be presented in high quality forms and effectively communicate (explain) the current problems and the reasons that a management strategy has been implemented. Only through effective communication can individual attitudes be affected (changed). This change in attitude then leads to longer, more lasting changes in behavior. This approach differs from enforcement where people are forced to behave in a certain way and which has little or no effect upon attitude change in the short term. This theory can be illustrated through a behavioral example observed during the course of the study. A trail closure sign, located in the Tip area during a portion of the birding season of 1986, which gave no indication of the reason of closure was shown to have 18% non-compliance among bird watchers. When non-compliers (other birders) were clearly evident on the closed trail beyond the sign, non-compliance rose to 50 percent. Had an explanation for the trail closure been given it is hypothesized, based upon the previously discussed considerations, that non-compliance would not have risen so dramatically even with non-compliers clearly evident within the closed areas.

The following is an ecological impact reduction equation which provides managers with an estimate of the area impacted by birders at Pelee based upon average visitation to the park and the effectiveness of various management strategies (some of which have been discussed above) in reducing this impact.

$$I(A) = V \quad A \quad .5D \quad .3B(educ) \quad .3B(enfor)$$

where:

I(A) - is the total area impacted in the park each day (square meters);

V - is the average number of people that enter the park each day;

A - is the area impacted by individual birders each day;

D - is the potential reduction in ecological impacts through facility design considerations;

B(educ) - is the potential reduction in ecological impacts through behavior modifications associated with education; and

B(enfor) - is the potential reduction in ecological impacts through behavior modification associate with law enforcement and increased staff visibility.

Each of the variables is described in more detail below.

The average number of people entering the park each day (V) is a value derived from total gate counts over the study period divided by the number of days in the study period (n=25).

The average area impacted by individual birders each day (A=85.1 square meters) is a constant and is based upon a number of different components. The first is the average number of times that individual birders leave trails each day (112). This figure was derived during off trail impact observation made during the study period. The second component of this constant is the average distance (meters) of off trail use by birders visiting the park during each off trail excursion (12.3 meters). The third component is the average length of an individual's stride (meters). This figure (.71 meters) was obtained from a study on the effects of off trail use on vegetation resources carried out in Western Montana (Cole 1985). The fourth, and final component of the constant is the surface area of the average bird watcher's foot which strikes the ground during individual strides. This figure, .042 square meters, is based upon a best guess as to the average shoe size of the average birder visiting Pelee. This average shoe size was estimated to be a size 9 with sole dimensions of approximately .3 meters in length and .14 meters in width. Therefore,

$$85.1\ m^2 = \frac{112\ \text{excursions} \times 12.3\ \text{m/excursion}}{.71\ \text{meters/stride}} \times .042\ m^2/\text{stride}$$

The potential impact reduction variable associated with improved facility design (D) was discussed in detail above. The potential impact reduction variable associated with behavior modification through education (B(educ)) was also discussed above. The effective reduction in impact coefficient however, is likely smaller than was discussed. The reduction in this impact coefficient to 30%, from the 45% reduction discussed earlier, may more accurately reflect the true effectiveness of educational and interpretive programming on visitor compliance. This figure is based upon the findings of Butler (1980), who examined the effectiveness of in-park interpretive programming (education) on visitor compliance.

The potential impact reduction associated with behavior modification through law enforcement and/or increased visibility of park staff through roving or point duty (B(enfor)) is another variable in the equation. The impact reduction coefficient (.3) was based upon a study carried out by Melnyk (1978), which examined the effectiveness of law enforcement on hunter compliance to rules and regulations associated with hunting in Alberta. Results from this study indicate that 30% of the compliance recorded was a result of the decrease in opportunity to break the law through visibility of, or potential encounters with, law enforcement officers during these acts of non-compliance.

Based upon an average visitation to the park, at time 1 (the current situation) of 3270 people per day, the impact reduction equation would account for a 95.5% reduction in impacts from 27.7 hectares (276,000 square meters) of cumulative birder impacts per day before the reduction programs were implemented to only 1.25 hectare (12,500 square meters) of cumulative birder impacts per day after the reduction programs were implemented. This represents a substantial decrease in birder impacts on the park environment. The overall reduction program however, is only as effective as the individual components of the program. Should the implementation of one component not be carried out, the effectiveness of the entire reduction program is substantially reduced.

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VII. Conclusion and Recommendations

Bird watching at Point Pelee National Park is increasingly being recognized as a world class experience. This is further reaffirmed by the fact that the majority of the birding visitors during the spring birding season (52%) are not Canadian. The Pelee experience, which combines elements of its natural setting, the social interactions of people with like experiences and interests, and the thrill of observing an unequalled birding resource, are reflective of the national role the park maintains in a systems perspective of other Canadian National Parks. It is essential to recognize the uniqueness of the Pelee experience in spring and to acknowledge in a global systems perspective that the primary experiential emphasis during that month of the year should be on birding, minimizing the factors which potentially diminish that experience (i.e., typological assymetrical antipathy), and maximizing the factors which enhance the experience.

For park managers faced with the decision of establishing use quotas and defining appropriate ecological and social conditions, the findings of this study re-affirm the need for establishing a clearer definition of the kind of recreation a site such as Point Pelee should provide. A major shortcoming of most management plans is the lack of measurable objectives and goals that allow managers to explicitly state the conditions they seek, in terms of measurable standards of appropriate ecological and social conditions, and to measure performance with respect to these standards (Hendee et al. 1978).

While the current management objectives of Point Pelee National Park, "to minimize environmental impact while optimizing visitor experience and educational opportunities" (Parks Canada 1982 p. 4) are a good beginning, they lack specific definition to facilitate effective decision making. Studies such as this one can provide the baseline information on the impact parameters required for setting these evaluative standards. Figure VII-1 provides an impact and management framework for bird watching activities at Point Pelee. The resource impact and intersocial demands resulting from expanding birder use at Pelee and the resulting management concerns are shown at the top of the flow diagram. The first phase, baseline data collection as it pertains to impact parameters and their interrelationships, is shown in the

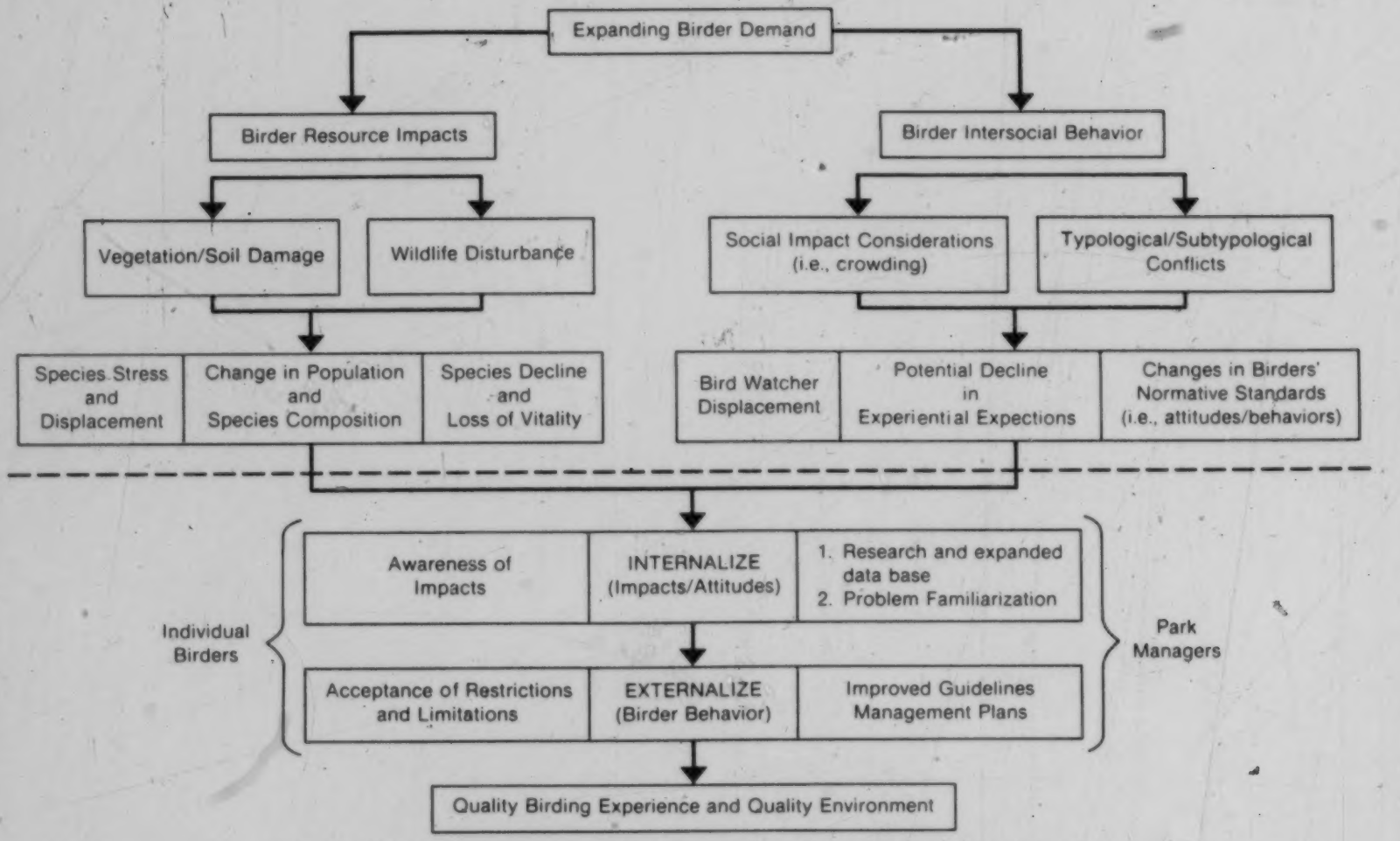

Figure VII-1. Social and ecological impact and management framework for bird watching activities at Point Pelee National Park

next part of the flow diagram. This data have now been collected and described in the previous three chapters. In order for this information to be of any use in a management context however, it must go through two different assimilation processes. The first assimilation process relates to internalization. The internalization process must be carried out by both park management personnel and individual birders actively participating in bird watching activities. Park managers must first internalize the fact that a problem exists. In the case of managers at Pelee, this requirement has already been recognized. The internalization process then requires park managers to initiate research studies, either internally or solicited from external sources, in those areas which they deem most important. This step has also been taken, obtaining an expanded data base on birder impacts, both social and ecological.

This internalization process is also important from the standpoint of individual bird watchers visiting the park and area. Bird watchers must recognize that they are the agents of potential impact occurring in the park. This realization may take place on its own or it may require some assistance on the part of park management by way of expanded interpretive programming as described in Part VI.

Externalization is the next step in the process. It again involves both managers and individual birders. Park managers, once they have recognized that a problem exists and have collected some baseline data, are now in a position to begin to take more informed management actions that would not otherwise be possible. These management actions could include short term strategies such as those described in Park V and VI, or include longer term strategies by way of improved management guidelines and management plans. Once implemented, these guidelines and plans would provide more informed direction in the management of the birder population visiting Point Pelee.

The externalization process on the part of individual birders would also follow the internalization process and would involve the assimilation of the impact information put forth by park management strategies and the acceptance of these management actions imposed to protect the environment and the quality of the birding experience itself. These rationalization processes, by both birders and park managers, would lead logically to a better quality

environment and the provision of a more quality birding experience.

The whole process is an on-going one with resource use being monitored through future related studies so that changes in use impacts, both social and ecological, can be recognized and management steps be taken to facilitate or mitigate this change. The integration of social science criteria, combined with resource management criteria, is seen as increasingly essential to the management of the experiential and ecological regimes of Point Pelee National Park.

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APPENDIX A

POINT PELEE PERSONAL INTERVIEW QUESTIONNAIRE

Date: Interview Number:

Time of Interview:
01 early morning
02 late morning
03 early afternoon
04 late afternoon

Introduction:

Hello. I am a member of a University of Alberta research team and we are conducting a visitor survey in cooperation with Parks Canada. We would be please if you would share with us some of your views concerning birding here at Pelee.

OBSERVATIONAL INFORMATION:

A. Sex of Respondent
01 male
02 female

B. Group Size:
01 02 03 04 05 06-10 11-20 >20

and Type:
01 individual
02 family
03 organized group
04 group of friends
05 couple

C. Photographer: 01 yes 02 no

D. Photographer Type:
01 Snapshot (no telephoto lenses)
02 Bird (adequate lens for birds)
03 Advanced (quality equipment and obvious skills)

INTERVIEW QUESTIONS:

Q-1. If a photographer, how many rolls of film do you take each day (on average)?

Q-2. Do you belong to a bird club? 01 yes 02 no
Name of Organization(s):

Q-3. Birding Experience:

1. How many days will you be at Point Pelee altogether?
2. How many times have you been to Point Pelee before this?
3. How many hours will you spend birding today (each day)?
4. How many years have you been actively birding?
5. How many days last year did you go birding?

Q-4. Have you been through the visitor centre this trip?

01 yes 02 no

Q-5. What things do you like/dislike most about birding at Point Pelee?

Likes:

Dislikes:

Q-6. How did you feel about the number of people present during your visit to Pelee?

01 far too many
02 too many
03 just right
04 too few

Do the number of people in the park today detract from your enjoyment here today?

01 yes

02 no

Q-7. What do you like/dislike most about other birders at Point Pelee?

Likes:

Dislikes:

Q-8. Socio-demographic information:

1. How many years of schooling have you completed?

High School 07 08 09 10 11 12

Post Secondary 13 14 15 16

Post Graduate 17 18 19 20 21 22 22+

2. How would you describe the type of work you do?

3. Would you describe your background as primarily:

01 urban 02 rural

4. What is your year of birth?

APPENDIX B

INTERVIEW QUESTIONNAIRE CODE BOOK

1. The questionnaire is coded on a total of three cards.
2. Each card begins with:
   a. a four digit respondent/questionnaire number;
   b. a one digit card number.
3. Questions A through D, 1 through 4, 6, 7a, 8, and 9 are coded on Card 1; Questions 5a is coded on Card 2; Questions 5b and 7b are coded on Card 3.

Variable 1. (cols 1-4) Four digit questionnaire number as on front page of questionnaire.

Variable 2. (cols 5) Card number - code 1.

Variable 3. (cols 6,7) Code date of interview.

Variable 4. (cols 8) Interview Location Code

Code:
- 01 DeLaurier Parking Lot
- 02 Marsh Boardwalk
- 03 Tip Concession
- 04 Train
- 05 Visitor Centre Parking Lot
- 06 Other
- 08 DK (don't know)

Variable 5. (cols 9) Sex of Respondent

Code:
- 01 male
- 02 female
- 08 DK (don't know)

Variable 6. (cols 10,11) Age of Respondent

Code actual age of person responding:

- 09 9 years old
- 10 10 years old
- 11 11 years old
- .
- .

89 89 years and older
98 DK (don't know)

Variable 7. (cols 12,13) Education of Respondent

Code number of years completed:

00 no formal schooling
01 1 year of formal schooling
.
.
.
12 completed high school
13 1 year of university/college
14 2 years of university/college
15 3 years of university/college
16 4 years of university
17 5 years of university/post graduate work
18 6 years of universtiy/post graduate work
19 7 years of university/post graduate work
20 8 years of university/post graduate work
21 9 years or more of university/post graduate work
98 DK (don't know or no response)

Variable 8. (cols 14) Residential Background

Code: 01 urban
02 rural
08 DK (don't know)

Variable 9. (cols 15-17) Type Of Work

Code as on Social Science Survey Occupation Classification (NORC 1981).
In addition code:
987 retired
989 unemployed
990 Student
998 DK (don't know)

Variable 10. (cols 18,19) Prestige Score

Code as on Social Science Survey Occupation Classification (NORC 1981).
In addition code:
99 retired, student, unemployed, DK (don't know)

Variable 11. (cols 20) Group Size

Code:
01 1 person
02 2 people
03 3 people
04 4 people
05 5 people
06 6 to 10 people
07 11 to 20 people
08 >20 people

Variable 12. (cols 21) Group Type

Code:
01 individual
02 family
03 organized group (i.e. bird club)
04 group of friends
05 couple
08 DK (don't know)

Variable 13. (cols 22) Photographer?

Code:
01 yes
02 no
08 DK (don't know)

Variable 14. (cols 23) Type of Photographer

Code:
01 snapshot (no telephoto lens)
02 bird photographer (adequate lens for birds)
03 advanced photographer (multiple camera/lens)

08 DK (don't know)
09 NA (not applicable)

Variable 15. (cols 24-26) Number of Pictures Taken

Code actual number taken per day (on average):

In addition code:	997	more than 996 pictures
	998	DK (don't know)
	999	NA (not applicable)

Variable 16. (cols 27) Bird Club Membership

Code: 1 yes
2 no
DK (don't know)

Variable 17. (cols 28) Number of Bird Club Affiliations

Code actual number of memberships:
1, 2, 3, 4, 5, 6, 7, 8. DK (don't know) 9. NA (not applicable)

Variable 18. (cols 29-33) Name of Conservation Organization

Code: 0 affiliated with organization
1 not affiliated with organization
9 NA (not applicable)

Columns
29 National Aububon Society
30 Federation of Ontario Naturalists
31 Ontario Field Ornithologists
32 Quebec Society for the Protection of Birds
33 Other

Variable 19. (cols 34,35) Days In Pelee Area

Code actual number of days spent during visit to area.

01 1 day
02 2 days
.
.
.
97 >96 days (live in area)
98 DK (don't know)

Variable 20. (cols 36,37) Number of Previous Visits to Pelee

Code actual number of previous visits.
00 never been to park before
01 once before
02 twice before
.
.
.
97 greater than 96 times before (live in area)
98 DK (don't know)

Variable 21. (cols 38,39) Hours Birding That Day

Code actual number of hours birding.
01 1 hour
02 2 hours
.
.
.
98 DK (don't know)

Variable 22. (cols 40,41) Years of Birding Experience

Code actual number of years of birding experience.
00 first time
01 1 year
02 2 years
.
.
.
98 DK (don't know)

Variable 23. (cols 42-44) Days of Birding Last Year

Code actual number of days.
000 none
001 1 day
002 2 days
.
.
.
998 DK (don't know or no answer)

Variable 24. (cols 45) Through the Visitor Centre Today

Code: 1 yes
2 no
8 DK (don't know)

Variable 25. (cols 46) Do the Number of People in the Park Today Detract From Your Enjoyment?

Code: 1 yes
2 no
8 DK (don't know)
9 NA (not asked)

Variable 26. (cols 47) Concern for Number of People in Park Today?

Code: 1 Far too many
2 Too many
3 Just right
4 Too Few
8 DK (don't know or can't say)

Variable 27. (cols 48-74) Responses About Things Liked About Other Birders

Code: 0 nonresponse
1 response

Columns
48 Dedicated
49 Enthusiastic
50 conduct around birds
51 do not litter
52 respect for environment
53 respect for others
54 Friendly
55 cheerful/pleasant
56 considerate
57 interest in others
58 social
59 talkative
60 International visitation
61 Knowledgeable
62 birding skills
63 educated
64 interest in wildlife
65 well prepared
66 Quiet/Keep to themselves
67 Range in age groups
68 Sharing
69 common interests
70 cooperative
71 helpful
72 information
73 sightings
74 Other

CARD 2.

Variable 28. (cols 6-56) Things Liked About Birding at Pelee

Code: 0 nonresponse
1 response

Columns
6 Birds
7 abundance of birds
8 close observations
9 concentrations
10 ease of sightings
11 good for beginners
12 listing
13 new or rare sightings
14 photographic opportunities
15 surrounding area
16 variety of birds
17 warblers
18 Challange
19 Enjoyable
20 beautiful/natural surroundings
21 clean
22 fresh air
23 reptiles/amphibians
24 spring
25 variety of habitats and vegetation
26 wetlands
27 Excitement
28 Facilities
29 bike trails
30 boardwalks
31 concession
32 nature centre
33 services
34 tables
35 trail system
36 train
37 wheelchair access
38 Family park
39 Few children
40 Friendly people
41 helpful people
42 helpful staff
43 Getting out/part of nature
44 Getting out/escape from city
45 Information/Interpretation
46 Location
47 access
48 close to home
49 Lots of People/Meet People
50 Park Management/Organization

51 no crowds
52 relaxing
53 quiet
54 unhurried
55 Tours
56 Uncommercialized

Variable 29. (cols 57-77) Things Disliked About Other Birders at Pelee

Code: 0 nonresponse
1 response

Columns
57 Children
57 Competition
58 avid birders
60 lister
61 possessive of lists
62 too aggressive
63 Crowded/Too Many People
64 Elderly
65 Flushing Birds
66 Nest Disturbances
67 offtrail use/vegetation trampling
68 pick flowers
69 Inconsiderate
70 Anti-social
71 Noisy
72 Step in Front of Viewing
73 Knowledge Misrepresentation
74 Photographers
75 Playing Tapes or Calls
76 Smoking
77 Other

CARD 3

Variable 30. (cols 6-44) Things Liked Least About Birding at Pelee

Code: 0 nonresponse
1 response

Column

6 Accomodation
7 Bilingualism - lack of
8 Birds
9 not enough birds from boardwalk
10 lack of bird research
11 Cars/Motorcycles
12 Competition/Listing
13 Dogs
14 Drive to Tip - unable to
15 Entrance Fee Increase
16 Environmental Impacts
17 delaurier trail
18 erosion at tip
19 trails/trampling
20 Facilities
21 benches - not enough
22 boardwalks
23 camping - booking problems
24 camping - not enough
25 concession - quality of food
26 concession - plastic under eaves
27 drinking fountains - not enough
28 parking
29 trains - crowded
30 visitor centre - no concession
31 Guided Bird Walks - lack of
32 Insects
33 Other User Groups
34 school groups
35 fisherman
36 Park Closure Times
37 Park Setting Unnatural
38 Park Too Small
39 People
40 crowded
41 noisy
42 novice birders
43 Politics
44 Signage Inadequate
45 Tripods on Boardwalk
46 Vegetation - too much
47 Weather
48 wind

APPENDIX C

POINT PELEE PARTICIPANT OBSERVATION FORM
RESOURCE FAMILIARIZATION ANALYSIS

Date: Location: Observer:

Time of Observation: 01 early morning 02 late morning 03 early afternoon 04 late morning

The following observations are for use as a key to fill in the abbreviated headings below:

1. Sex M(01) F(02)
2. Approximate Age: 01 (<11) 02 (11-20) 03 21-30 04 31-40 05 41-50 06 51-60 07 >61
3. Group Size 01 02 03 04 05 06 (6-10) 07 (11-20) 08 (>20)
4. Group Type 01 individual 02 family 03 organized 04 friends 05 couple
5. Photographer 01 Snapshot (no telephoto) 02 Bird (adequate lens for birds) 03 Advanced (obvious equipment/skills)
6. Birder 01 Novice 02 General 03 Advanced
7. Basic Species Question a. General Y(01) N(02) b. Specific (highest knowledge) Y(01) N(02)

OBS. #	1. sex	2. age	3. size	4. type	5. photo	6. birder	7a. gen	7b. spec	Species in question	Notes
1.										
2.										
3.										
4.										
5.										
6.										
7.										
8.										
9.										
10.										
11.										
12.										
13.										
14.										
15.										

APPENDIX D

RESOURCE FAMILIARITY PARTICIPANT OBSERVATION CODE BOOK

1. The participant observations related to resource familiarization were coded on one card;
2. Each card begins with:
   a. a three digit observation number;
   b. a one digit card number.

Variable 1. (cols 1-3) Three digit observation number as on front of observation form.

Variable 2. (cols 4) Card number - code 1.

Variable 3. (cols 5,6) Code date of observation.

Variable 4. (cols 7) Observation Location

Code:
- 01 Tip Area
- 02 Loop Woods
- 03 Sparrow Field
- 04 Tilden Woods
- 05 Woodland Nature Trail
- 06 DeLaurier Trail
- 07 Marsh Boardwalk
- 08 DK (don't know)

Variable 5. (cols 8) Time of Observation

Code:
- 01 early morning
- 02 late morning
- 03 early afternoon
- 04 late afternoon
- 08 DK (don't know)

Variable 6. (cols 9) Sex of Birder Under Observation

Code:
01 male
02 female
08 DK (don't know)

Variable 7. (cols 10) Approximate Age of Birder Under Observation

Code:
01 less than 11 years of age
02 11 to 20 years of age
03 21 to 30 years of age
04 31 to 40 years of age
05 41 to 50 years of age
06 51 to 60 years of age
07 greater than 60 years of age
08 DK (don't know)

Variable 8. (cols 11) Group Size

Code:
01 1 person
02 2 people
03 3 people
04 4 people
05 5 people
06 6 to 10 people
07 11 to 20 people
08 >20 people

Variable 9. (cols 12) Group Type

Code:
01 individual
02 family
03 organized group
04 group of friends
05 couple
08 DK (don't know)

Variable 10. (cols 13) Photographer?

Code: 01 yes
02 no
08 DK (don't know)

Variable 11. (cols 14) Type of Photographer

Code: 01 snapshot
02 bird photographer
03 advanced photographer
08 DK (don't know)
09 NA (not applicable)

Variable 12. (cols 15) Level of Birder

Code: 01 Novice
02 General
03 Advanced
08 DK (don't know)

Variable 13. (cols 16) Species in Question

Code: 01 Bird
02 Butterfly/insect
03 Fish
04 Mammal
05 Plants
06 Reptile
07 Amphibian
08 DK (don't know)

Variable 14. (cols 17) Answer General Question

Code: 01 yes
02 no
08 DK (don't know)

Variable 15. (cols 18) Answer Specific Question

Code: 01 yes
02 no
08 DK (don't know)

APPENDIX E

Complete List Of Conservation Organizations To Which Bird Watchers Interviewed At Point Pelee National Park Were Affiliated - Spring, 1985

Conservation Organization	Conservation Organization
American Birding Association	MacIlwraigth Field Naturalists
American Ornithological Club	Marie-Victorian
Bluebird	Maryland Ornithological Club
Brampton Wildlife Society	Massechussetes Bird Club
Brantford Nature Club	Medrune Audubon Society
Brooklyn Bird Club	Michigan Audubon Society
Buffalo Ornithological Club	Midland Nature Centre
Calgary Field Naturalists	Mississinawa Bird Club
Canadian Wildlife Federation	Mississippi Bend Bird and Nature Club
Chicago Ornithological Club	MMuskoka Field Naturalists
Chipewan Nature Centre	National Audubon Society
Cinncinatti Bird Club	Nature Conservancy of Canada
Dahlam Nature Centre	New Jersey Naturalists Club
Delaware Valley Ornithological Society	Niagra Falls Naturalist Club
Denver Field Ornithologists	Norfolk Field Naturalists
Denver Ornithological Society	Nova Scotia Bird Society
Detroit Audubon Society	Oakland Audubon Society
Durham Field Naturalists	Ontario Field Naturalists
Edmonton Natural History Club	Ontario Field Ornithologists
Essex County Naturalists	Ottawa Field Naturalists
Federation of Alberta Naturalists	Peninsular Field Naturalists
Federation of Ontario Naturalists	Pickering Naturalists
Friends of the Spit	Piering Field Naturalists
Gennesse Ornithological Society	Point Reyes Bird Observatory
Guelph Field Naturalists	Quebec Society for the Protection of Birds
Hamiltion Naturalists	Richmont Hill Naturalist Club
Hancock County Naturalists	Rochester Birding Association
Hartland Nature Club	Sault Naturalists
	South Pelee Naturalists
Hawkeye Bird Club	Stratford Field Naturalists
Indianna Audubon Society	Toronto Bird Observatory
Isnos Bird Club	Toronto Field Naturalists
Kawartha Field Naturalists	Toronto Ornithological Club
Kingston Field Naturalists	Vancouver Natural History Club
Kirtland Bird Club	Victoria Naturalist Society
Lambton Wildlife Society	West Elgin Nature Club
Lanchester County Bird Club	Western Field Ornithologists
Leamington Nature Club	Whitefish Point Bird Observatory
Linnean Society	Wilson Bulletin
Long Point Bird Observatory	Woodstock Field Naturalists
	Wynzotte Bird Club
	Santa Barbara Audubon Society
	Ontario Audubon Society

APPENDIX F

Complete List of Birder Responses of Things Liked About Birding at Point Pelee National Park - Spring, 1985

Response	Frequency	Percent of Total
Birds	2084	61.70
Abundance	(388)	
Birds	(816)	
Close Observations	(21)	
Concentration	(134)	
Ease of Sighting	(51)	
Good for Beginners	(9)	
Listing	(1)	
New or Rare Birds	(104)	
Photographic Opportunities	(21)	
Surrounding Area	(21)	
Variety of Birds	(454)	
Warblers	(64)	
Challenge	8	0.24
Enjoyable	11	0.32
Environment	379	11.20
Beautiful/ Natural Surroundings	(169)	
Clean	(28)	
Fresh air	(10)	
Reptiles/ Amphibians	(2)	
Spring	(5)	
Variety of Habitat/Vegetation	(150)	
Wetlands	(15)	
Excitement	19	0.50
Facilities	256	7.60
Boardwalks	(19)	
Concession	(6)	
Facilities	(30)	
Nature Centre	(50)	
Services	(2)	
Tables	(4)	
Trail system	(83)	
Train	(51)	
Wheelchair access	(11)	
Family Park	2	0.06
Few Children	1	0.03
Friendly People	242	7.16
Friendly	(66)	
Helpful people	(37)	
Helpful staff	(35)	
Meet people	(104)	
Getting Out	52	1.5
Be part of nature	(42)	
Escape from city	(10)	
Information/Interpretation	74	2.2
Location	49	1.5
Access	(25)	
Close to home	(7)	
Location	(17)	
Park Management/Organization	126	3.7
Peaceful	65	1.9

No crowds	(6)	
Relaxing	(21)	
Quiet	(31)	
Unhurried	(7)	
Tours	1	0.03
Uncommercialized	11	0.32
TOTAL	3380	100.00

APPENDIX G

Complete List of Birder Responses of Things Disliked About Birding at Point Pelee National Park - Spring, 1985

Response	Frequency	Percent of Total
Accommodation	49	6.3
Bilingualism	6	0.8
Birds	7	0.9
Not enough from boardwalk	(6)	
Lack of research	(1)	
Cars/Motorcycles	2	0.3
Competition/Listing	6	0.8
Dogs	9	1.1
Drive To Tip - unable to	5	0.6
Entrance Fee Increase	2	0.3
Environmental Impacts	37	4.7
DeLaurier trail	(3)	
Erosion at tip	(6)	
Trails/trampling	(28)	
Facilities	145	18.5
Boardwalks	(4)	
Camping - booking problems	(11)	
Camping - not enough	(57)	
Concession - food quality	(37)	
Concession - plastic under eaves	(1)	
Drinking fountians - not enough	(2)	
Parking	(18)	
Trains crowded	(8)	
Visitor centre - no concession	(5)	
Guided Bird Walks - lack of	46	5.9
Insects	13	1.7
Park Closure Times	12	1.5
Park Setting Unnatural	6	0.8
Park Too Small	3	0.4
People	394	50.4
Crowded	(329)	
Novice birders	(4)	
Noisy	(16)	
Other user groups	(25)	
Other user groups - school	(23)	
Other user groups - fisherman	(13)	
People	(4)	
Politics	1	0.1
Signage - Inadequate	21	2.6
Vegetation - Too Much	1	0.1
Weather	13	1.7
Wind	4	0.5
TOTAL	782	100.0

APPENDIX H

Complete List of Birder Responses of Things Liked About Other Birders at Point Pelee National Park - Spring, 1985

Response	Frequency	Percent of Total
Dedicated	26	1.4
Enthusiastic	49	2.6
Environmental Conduct	184	9.6
Conduct around birds	(29)	
Do not litter	(17)	
Respect for environment	(75)	
Respect for other birders	(63)	
Friendly	642	33.6
Considerate	(69)	
Friendly	(362)	
Interest in others	(11)	
Pleasant/cheerful	(111)	
Social	(77)	
Talkative	(12)	
International Visitation	34	1.8
Knowledgeable	140	7.3
Birding skills	(18)	
Educated	(8)	
Interest in wildlife	(9)	
Knowledgable	(100)	
Well prepared	(5)	
Quiet/Keep To Themselves	56	2.9
Range In Ages	5	0.3
Sharing	705	36.9
Common interests	(96)	
Co-operative	(116)	
Helpful	(293)	
Information	(68)	
Sharing	(93)	
Sightings	(39)	
Others	69	3.6
TOTAL	1910	100.0

APPENDIX I

Complete List of Birder Responses of Things Disliked About Other Birders at Point Pelee National Park - Spring, 1985

Responses	Frequency	Percent of Total
Children	8	1.5
Competition	116	21.8
Avid birders	(6)	
Competition	(38)	
Listers	(37)	
Too aggressive	(35)	
Crowded/Too Many	5	0.9
Elderly	6	1.1
Environmental Disturbances	217	40.7
Environmental disturbances	(30)	
Flushing of birds	(86)	
Nest disturbances	(8)	
Offtrail use/trampling	(109)	
Pick flowers	(9)	
Playing tapes/calls	(5)	
Inconsiderate	108	20.4
Anti-social	(5)	
Inconsiderate	(50)	
Noisy	(42)	
Step in front of view	(11)	
Knowledge Misrepresentation	28	5.2
Photographers	31	5.8
Smoking	14	2.6
TOTAL	533	100.0

APPENDIX J

Table IV-13. Point Pelee National Park Visitor Centre Guest Book Count - April 1 to May 14, 1985

Place of Origin	Frequency	Percent of Total
Canada,	546	48.0
Alberta	(11)	
British Columbia	(18)	
Manitoba	(8)	
New Brunswick	(2)	
Newfoundland	(1)	
Northwest Territories	(1)	
Nova Scotia	(7)	
Ontario	(450)	
Quebec	(54)	
Saskatchewan	(2)	
United States	521	47.0
Alaska	(1)	
California	(15	
Colorado	(4)	
Conneticut	(1)	
Florida	(5)	
Idaho	(2)	
Illinois	(52)	
Indiana	(18)	
Kansas	(2)	
Maine	(3)	
Maryland	(3)	
Massechusettes	(1)	
Michigan	(285)	
Minnesota	(2)	
Missouri	(3)	
Montana	(4)	
New Hamshire	(2)	
New York	(24)	
North Carolina	(2)	
Ohio	(57)	
Oklahoma	(2)	
Oregon	(3)	
Pennsylvania	(3)	
Texas	(3)	
Utah	(1)	
Vermont	(5)	
Virginia	(3)	
Washington	(2)	
Washington, D.C.	(2)	
Wisconsin	(2)	
International	65	5.0
Austria	(1)	
Australia	(3)	
Belgium	(7)	
France	(1)	
Holland	(8)	
Hong Kong	(5)	

Iceland	*(1)*	
Italy	*(4)*	
Jamaica	*(1)*	
Lebanon	*(2)*	
Malaysia	*(1)*	
Norway	*(1)*	
United Kingdom	*(22)*	
England		
Ireland		
Scotland		
Wales		
Total	*1132*	100.0

APPENDIX K

POINT PELEE PARTICIPANT OBSERVATION FORM
VISITOR INTERACTION ANALYSIS

Date: Location: Observer:

Time of Observation: 01 early morning 02 late morning 03 early afternoon 04 late morning

The following observations are for use as a key to fill in the abbreviated headings below:

1. Sex M(01) F(02)
2. Approximate Age: 01 (<11) 02 11-20 03 21-30 04 31-40 05 41-50 06 51-60 07 (>61)
3. Group Size 01 02 03 04 05 06 (6-10) 07 (11-20) 08 (>20)
4. Group Type 01 individual 02 family 03 organized 04 friends 05 couple
5. Photographer 01 Snapshot (no telephoto) 02 Bird (adequate lens for birds) 03 Advanced (obvious equipment/skills)
6. Birder 01 Novice 02 General 03 Advanced
7. Type of Interaction 01 give info 02 ask for info 03 simple greeting 04 avoidance
8. Duration (minutes) 9. Reaction to Interaction 01 positive 02 negative

OBS. #	1. sex	2. age	3. size	4. type	5. photo	6. birder	7. type	8. length	9. reaction	Notes
1.										
2.										
3.										
4.										
5.										
6.										
7.										
8.										
9.										
10.										
11.										
12.										
13.										
14.										
15.										

APPENDIX L

VISITOR INTERACTION PARTICIPANT OBSERVATION CODE BOOK

1. The participant observations related to visitor interactions are coded on one card;
2. Each card begins with:
   a. a three digit observation number;
   b. a one digit card number.

Variable 1. (cols 1-3) Three digit observation number as on front of observation form.

Variable 2. (cols 4) Card number - code 1.

Variable 3. (cols 5,6) Code date of observation.

Variable 4. (cols 7) Observation Location

Code:
- 01 Tip Area
- 02 Loop Woods
- 03 Sparrow Field
- 04 Tilden Woods
- 05 Woodland Nature Trail
- 06 DeLaurier Trail
- 07 Marsh Boardwalk
- 08 DK (don't know)

Variable 5. (cols 8) Time of Observation

Code:
- 01 early morning
- 02 late morning
- 03 early afternoon
- 04 late afternoon
- 08 DK (don't know)

Variable 6. (cols 9) Sex of Birder Under Observation

Code:
01 male
02 female
08 DK (don't know)

Variable 7. (cols 10) Approximate Age of Birder Under Observation

Code:
01 less than 11 years of age
02 11 tp 20 years of age
03 21 to 30 years of age
04 31 to 40 years of age
05 41 to 50 years of age
06 51 to 60 years of age
07 greater than 60 years of age
08 DK (don't know)

Variable 8. (cols 11) Group Size

Code:
01 1 person
02 2 people
03 3 people
04 4 people
05 5 people
06 6 to 10 people
07 11 to 20 people
08 >20 people

Variable 9. (cols 12) Group Type

Code:
01 individual
02 family
03 organized group
04 group of friends
05 couple
08 DK (don't know)

Variable 10. (cols 13) Photographer?

Code: 01 yes
02 no
08 DK (don't know)

Variable 11. (cols 14) Type of Photographer

Code: 01 snapshot
02 bird photographer
03 advanced photographer
08 DK (don't know)
09 NA (not applicable)

Variable 12. (cols 15) Level of Birder

Code: 01 Novice
02 General
03 Advanced
08 DK (don't know)

Variable 13. (cols 16) Type of Interaction

Code: 01 give information
02 ask for information
03 simple greeting
04 avoidance
08 DK (don't know)

Variable 14. (cols 17-19) Duration of Interaction

Code length of interaction in seconds.
In addition code:

000 no interaction
997 997 seconds or greater
998 DK (don't know)

Variable 15. (cols 20) Reaction to Interaction

Code: 01 positive
02 negative
08 DK (don't know)

APPENDIX M

POINT PELEE PARTICIPANT OBSERVATION FORM
OFFTRAIL IMPACT ANALYSIS

Date: Location: Observer:

Time of Observation: 01 early morning 02 late morning 03 early afternoon 04 late morning

The following observations are for use as a key to fill in the abbreviated headings below:

1. Sex M(01) F(02)
2. Approximate Age: 01 (<11) 02 11-20 03 21-30 04 31-40 05 41-50 06 51-60 07 (>61)
3. Group Size 01 02 03 04 05 06 (6-10) 07 (11-20) 08 (>20)
4. Group Type 01 individual 02 family 03 organized 04 friends 05 couple
5. Photographer 01 Snapshot (no telephoto) 02 Bird (adequate lens for birds)
   03 Advanced (obvious equipment/skills)
6. Birder 01 Novice 02 General 03 Advanced 7. Time off trail (minutes)
8. Distance off trail (meters) 9. Bird flushed Y(01) N(02) 10. Plant damage Y(01) N(02)
11. Type of impact 01 exploratory 02 pursuit 03 margin viewing
    04 passing people 05 wide cluster 06 wet trail

OBS. #	1. sex	2. age	3. size	4. type	5. photo	6. birder	7. time	8. dist	9. flush	10. damag	11. impact	Briefly describe impact
1.												
2.												
3.												
4.												
5.												
6.												
7.												
8.												
9.												
10.												
11.												
12.												
13.												
14.												
15.												

APPENDIX N

OFFTRAIL IMPACT PARTICIPANT OBSERVATION CODE BOOK

1. The participant observations related to offtrail impacts were coded on one card;
2. Each card begins with:
   a. a three digit observation number;
   b. a one digit card number.

Variable 1. (cols 1-3) Three digit observation number as on observation form.

Variable 2. (cols 4) Card number - code 1.

Variable 3. (cols 5,6) Code date of observation.

Variable 4. (cols 7) Observation Location

Code:
- 01 Tip Area
- 02 Loop Woods
- 03 Sparrow Field
- 04 Tilden Woods
- 05 Woodland Nature Trail
- 06 DeLaurier Trail
- 07 Marsh Boardwalk
- 08 DK (don't know)

Variable 5. (cols 8) Time of Observation

Code:
- 01 early morning
- 02 late morning
- 03 early afternoon
- 04 late afternoon
- 08 DK (don't know)

Variable 6. (cols 9) Sex of Birder Under Observation

Code: 01 male
02 female
08 DK (don't know)

Variable 7. (cols 10) Approximate Age of Birder Under Observation

Code: 01 less than 11 years of age
02 11 to 20 years of age
03 21 to 30 years of age
04 31 to 40 years of age
05 41 to 50 years of age
06 51 to 60 years of age
07 greater than 60 years of age
08 DK (don't know)

Variable 8. (cols 11) Group Size

Code: 01 1 person
02 2 people
03 3 people
04 4 people
05 5 people
06 6 to 10 people
07 11 to 20 people
08 >20 people

Variable 9. (cols 12) Group Type

Code: 01 individual
02 family
03 organized group
04 group of friends
05 couple
08 DK (don't know)

Variable 10. (cols 13) Photographer?

Code:
01 yes
02 no
08 DK (don't know)

Variable 11. (cols 14) Type of Photographer

Code:
01 snapshot
02 bird photographer
03 advanced photographer
08 DK (don't know)
09 NA (not applicable)

Variable 12. (cols 15) Level of Birder

Code:
01 Novice
02 General
03 Advanced
08 DK (don't know)

Variable 13. (cols 16,17) Time Off Trails (minutes)

Code number of minutes spent off designated trails.

00 less than one minute
01 one minute off designated trails
.
.
.
97 greater than 97 minutes off designated trails
98 DK (don't know)

Variable 14. (cols 18-20) Distance Off Trail (meters)

Code number of meters of offtrail use.

001 1 meter
002 2 meters
003 3 meters
.
.
.
997 997 meters or greater
998 DK (don't know)

Variable 15. (cols 21) Bird Flushed?

Code: 01 yes
02 no
08 DK (don't know)

Variable 16. (cols 22) Plant Damaged?

Code: 01 yes
02 no
08 DK (don't know)

Variable 17. (cols 23) Type of Offtrail Impact

Code: 01 exploratory
02 pursuit
03 margin viewing
04 passing people
05 wide cluster
06 wet trail
08 DK (don't know)

APPENDIX O

VISITOR DISPLAY EFFECTIVENESS OBSERVATION FORM

Date: Time Period: Observer:

Number of People Entering Centre	Sex (m/f)	Age (yrs)	Photo (Y/N)	View Impact Display Time(sec)	View Info Display Time(sec)
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
17.					
18.					
19.					
20.					